

JUN 13 1938



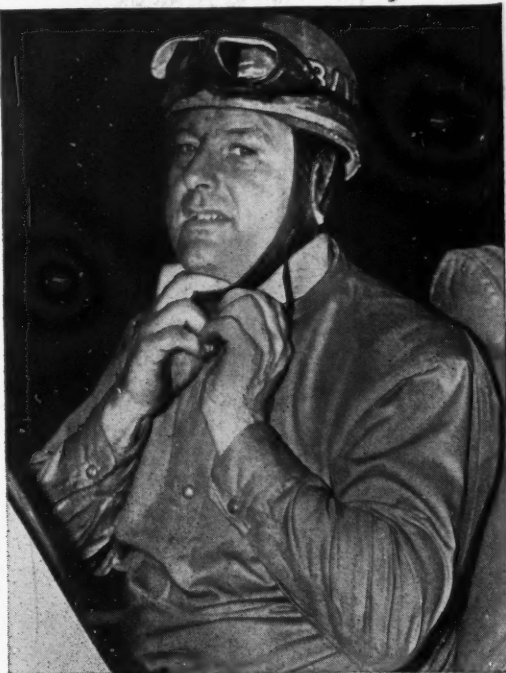
MOTOR AGE

CHILTON PUBLICATION

DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

JUNE
1938

IN THIS ISSUE



Floyd Roberts

... whose average speed of 117.200 m.p.h. brought him the checkered flag and first place at Indianapolis. See page 10.

Right from the Pits

The story of the Indianapolis race written especially for Motor Age readers. Specifications of all the cars in the race and their performance records.

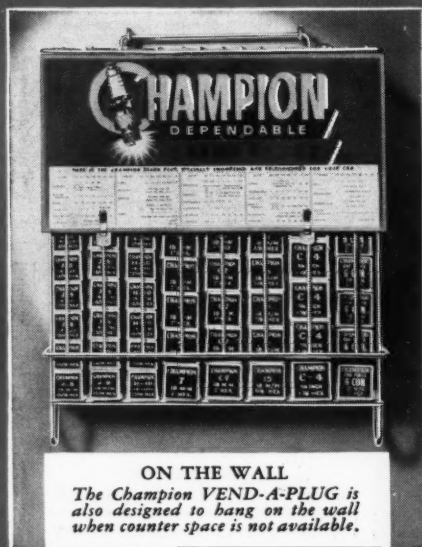
Servicing Buick Transmissions

A complete description of service methods on this unit. You'll find it well worth studying.

More Light on Lights

Continuing last month's illustrated story on aiming headlight beams.

Presenting-



ON THE WALL
The Champion VEND-A-PLUG is also designed to hang on the wall when counter space is not available.

THE NEW—PRACTICAL CHAMPION VEND-A-PLUG MERCHANDISER



ON THE COUNTER
The Champion VEND-A-PLUG takes up very little space, keeps the spark plugs constantly before customers, provides an efficient service stock with size chart.



For Dealers Who Want More Profit

At last! Here is a merchandiser that really displays spark plugs. Hang it on the wall. Stand it up on your counter. Place it wherever it will do the best job, and best suit your convenience or space limitations. It's *practical*.

The new Champion VEND-A-PLUG comes packed with an assortment of 50 Champion Spark Plugs which will service 90% of all cars and trucks. Capacity 80. It's *practical*.

The Champion VEND-A-PLUG is packed with an assortment of forceful, dealer helps. It's *practical*!

Your cost, complete \$20.80

Your profit 11.70

The new Champion VEND-A-PLUG will last indefinitely. Kept on display it will continue to sell Champion Spark Plugs and multiply your profits because—it's *practical*!

Champion Spark Plugs outsell throughout the world because they're better spark plugs. They are universally conceded to be one of the fastest selling items in any dealer's stock. The turnover is many times a year, giving dealers steady multiple profits. Call your jobber salesman for a Champion VEND-A-PLUG merchandiser now and start making more and steadier profits with Champions.

The Name **ALTINIZED**

***If they're not ALTINIZED
... they're not as good!***

The name ALTINIZED comes from AL—Alloy; TIN—tin base (Tin Base Alloy).

Experience has proved that tin is the best bearing material available. A coating of tin base bearing alloy is now electrically applied to the surfaces of Super-X Rings. This exclusive finish gives these famous rings performance features no other spring expander rings can possibly have. And they have eye appeal . . . they're clean, white, good looking.



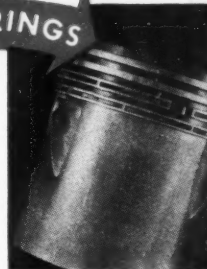
**Made to *OUTPERFORM*
Priced to *OUTSELL!***

This Piston Fitted with USUAL RINGS



Here is reproduced the actual unretouched photograph of a piston fitted with usual rings and run in a motor. It shows the rings and piston were both badly scuffed and worn during the break-in period. The rings have never seated. Proper sealing action of the rings is impossible due to worn surfaces. Impaired ring condition extended into the piston making it impossible for the whole assembly to give proper service.

This Piston Fitted with ALTINIZED RINGS



This reproduction of an unretouched photograph of a piston fitted with Altinized Super-X Rings and run in a motor under the same conditions as the piston at the left shows that there was practically *no scuffing or wear on rings or piston during the break-in period*. The rings are properly seated. The sealing action is positive due to the Altinized Finish. *Ring operation is successful and the whole assembly operates efficiently.*

If they're not ALTINIZED... they're not as good!

**FASTER SEALING
AGAINST
OIL AND GAS**

**NATURAL WEAR LIFE
INCREASED 33⅓%
BY ACTUAL
TESTS**

Super-X

REG. U. S. OF A. PAT. OFF.

PISTON RINGS KING QUALITY

It's Grease Retainer Time



**SELL
FITZGERALD**

for better results, better business

● Now is the time to sell your customers new oil and grease retainers. It's important in getting ready for summer driving.

Tell your customers how warm weather driving puts an extra strain on oil and grease retainers. . . Then, for best results, sell them Fitzgerald—the high quality retainers that do a thorough job of sealing lubrication in bearings.

Your jobber has full information. Also let him tell you about Fitzgerald's complete gasket service. . . The Fitzgerald Manufacturing Company, Torrington, Conn.—Branches, Chicago and Los Angeles—New York Office—Canadian Fitzgerald, Limited, Toronto.

**FITZGERALD
GASKETS**



THE COMPLETE LINE THAT COMPLETELY SATISFIES

MOTOR AGE

DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

Subscriptions for Motor Age are accepted only from independent repair shops and their employees.

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MOTOR AGE

JUNE 1938



SHOP TALK

Spring Fever

It has been tough enough to keep my mind on business but when Rowden of the Lambert photographic studios came in the office with the photo shown on this page I just couldn't do any more work that day. So Geoff Grier, our art editor who can swing a mean surf rod, and I planned a fishing trip for the week end. We went down to Bethany Beach, Del., and Geoff got one small king fish which was twice as much as I got. However, the Scotch was good.

Better Timing

Well, that article "Performance Requires Perfect Timing" which appeared in the March issue, together with the readers comments which I published last month is still attracting a lot of attention. Don Stetler, who hales from Kingfisher, Okla., after commenting very unfavorably on the mentality of one W. C. Condit, is surprised that any mechanic working on today's cars would think that the article was the bunk. "In my estimation, that was one of the best articles written

to date," says Don, but instead of running the engine at 30 m.p.h. as recommended in the article, Don says to use a speed of 60 to 70 m.p.h.

Goat Glands

George Fich of Hermoso Beach, Cal., also strikes a responsive cord when he says timing an engine by the method outlined has worked out swell and is like grafting on a set of goat glands or something. George does the maintenance on a fleet of forty cars—Fords, Chevies and Studebakers. On one Ford and one Chevie he got a terrible ping, but in every other case it worked swell.

Spark Knock

Jim Millette of Lafayette, N. Y., tried it on a 1933 Plymouth with a 6.5 to 1 head, got a bad knock on wide open throttle, and wants to know why it didn't work.

Guesses

I don't know why you can't time some of these jobs by that method.

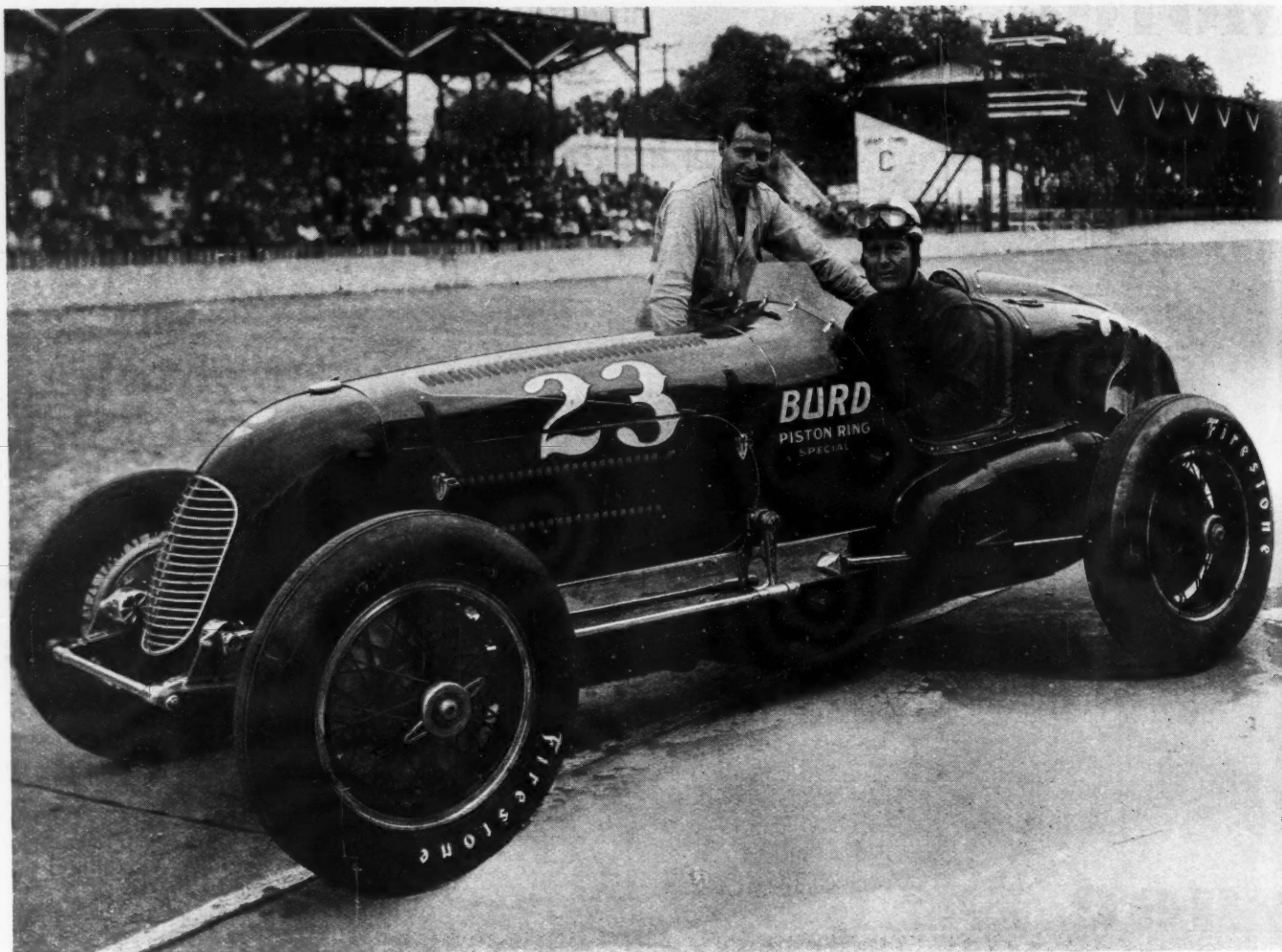
However, my guess is that in at least some of the cases the trouble would be found in the carburetor supplying too lean a mixture for the higher speeds. Another guess is that the automatic advance springs are haywire and cut in too fast above the speeds at which the spark was timed.

I think the automatic advance should be thoroughly checked in every case before timing the ignition. And in addition, check the carburetor, making sure that it is clean, that the jets are OK and that the economizer is working.

Suggestions

Another suggestion was made by Cal Crooks of Springfield, Mass. He believes that Higgins, whose letter was published last month, failed to short out four cylinders before bringing the rear wheels up to 30 m.p.h. He believes that if the cylinders are shorted out after bringing the speed up to 30 m.p.h., that the vacuum would be too low to bring the distributor to its maximum advance. I haven't had a

(Continued on page 23)



Roberts Wins "500"

Sets new record of 117.200 m.p.h. with 4 cylinder non-supercharged engine

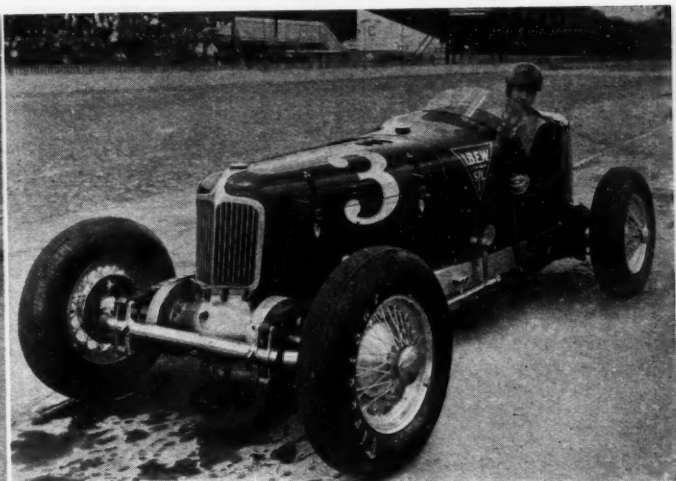
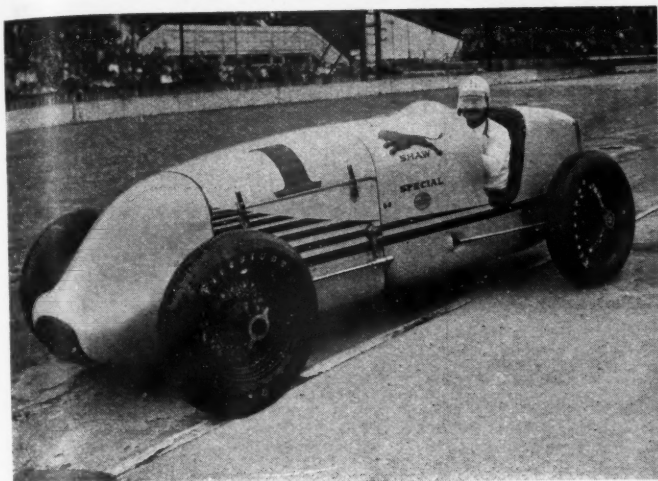
DRIVING the fastest race ever run on the Indianapolis Speedway, Floyd Roberts led the field to victory in the 1938 classic covering the 500 miles in 4 hours 15 minutes and 58.4 seconds—an average speed of 117.2 miles per hour. Wilbur Shaw, 1937 winner, placed second with an average speed of 115.580 miles per hour, with Chet Miller crossing the finish line one minute and 26 seconds later to capture third place with an average speed of 114.946 miles per hour.

Rex Mays took the lead at the first lap and held it for the first 25 miles, setting a pace of 119.843 miles per hour. He was driving an Alfa Romeo car, and seemed to have the edge on the rest of the

boys. But Jimmy Snyder, in a new Sparks-Thorne Special, gradually overhauled him and took the lead, stepping up the pace to 120 miles per hour and holding it there until after the 175 mile mark had passed. Mays' car developed supercharger trouble and was forced out of the race.

At the end of 200 miles Floyd Roberts, who had been among the first five cars during the early part of the race, edged into the lead and from that point on it was a battle between him and Snyder with first

one and then the other out in front. Roberts went to the pit at the 106th lap to take on a supply of gas and change a right rear tire—the only stop he made during the entire 500 miles. In spite of the fact that Snyder had made two stops for gas, the 300 mile point found him again in the lead which he held for better than 50 miles. Trouble developed, however, and when the hose connection to his supercharger split he was all through. Roberts took the lead and held it throughout the remainder of the race.



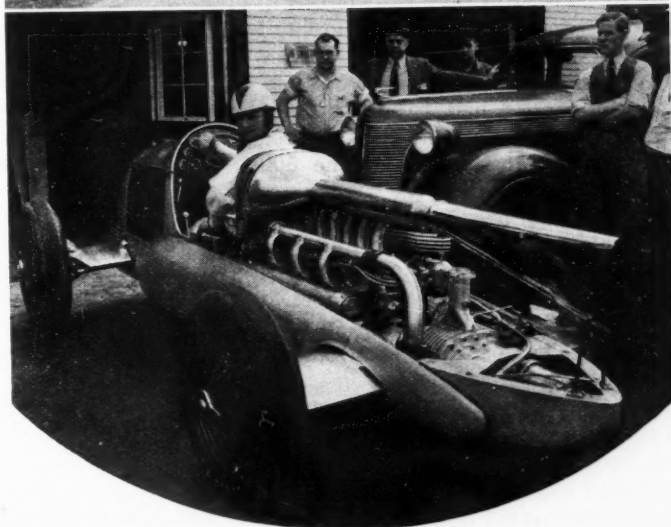
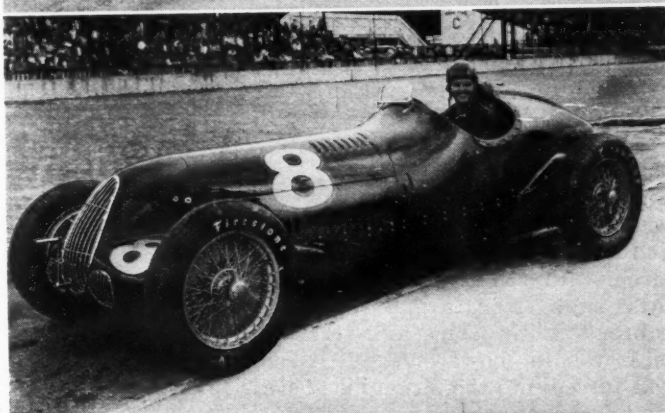
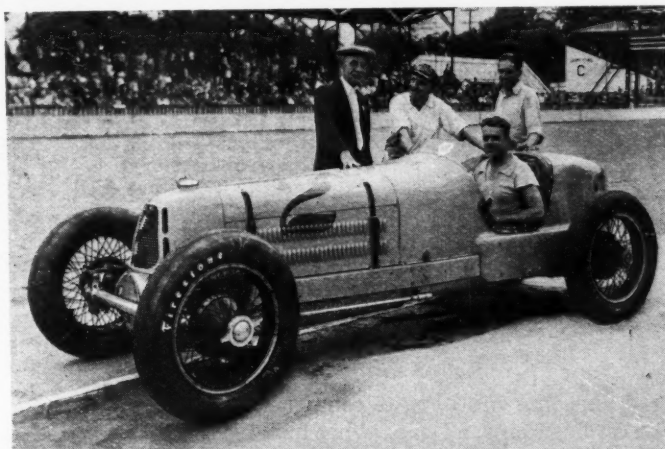
Left Page—The Winner, Floyd Roberts, setting a new track record of 117.2 miles per hour.

Above—Wilbur Shaw placed second, at 115.580 m.p.h., 2 miles per hour faster than his own record set last year.

Right, down the column—Chet Miller finished third, in car No. 3. Ted Horn came in fourth, in car No. 2. Rex Mays led the first lap and the first 25 miles at an average speed of 119.8 m.p.h., driving an Alfa Romeo. The rear-engine Miller was the talk of the track, and presented many new mechanical features, including four wheel drive and four wheel independent suspension.

**BY
BOB HANKINSON**

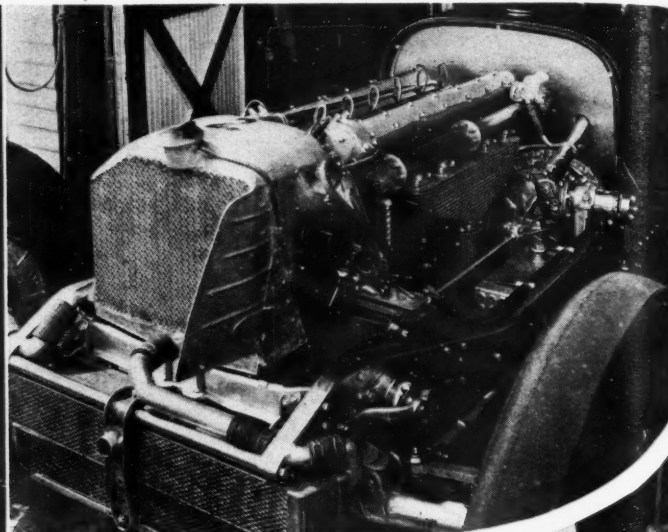
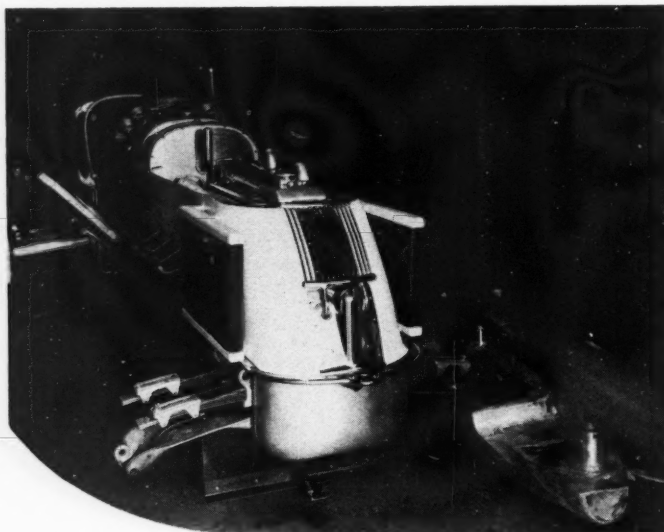
**See page 37 for specifications
and performance data**



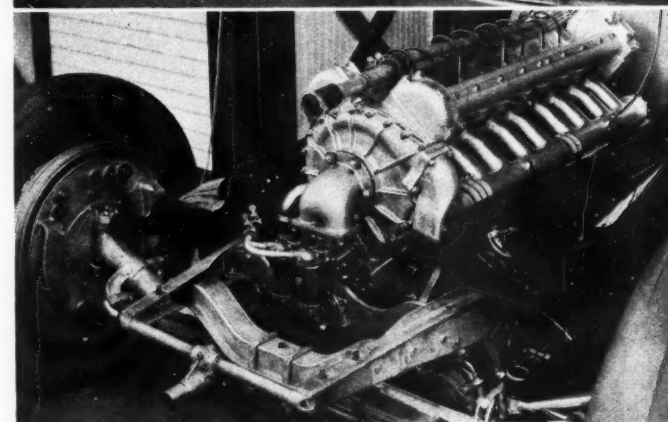
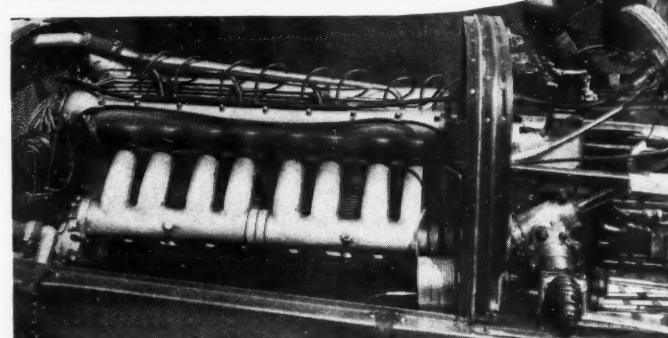
Ronney Householder, driving another Sparks-Thorne Special, and doing an excellent job of it, turned the wheel over to Billy Winn at the end of the 139th lap. Billy set out after the leaders and made a strong bid for second place until he was forced to quit when his car developed the same trouble as his teammate's, Snyder.

Wilbur Shaw, who had been in 10th place at the end of the first 25 miles, had been gradually creeping up through his characteristically steady driving. One pit stop was enough to see him through, and this came at the 114th lap when he took on gas and water and changed three tires. However, he had to

(Continued on next page)



Above—one of the Miller specials, showing the radiators mounted on the sides and the dual transverse springs used in connection with four wheel independent suspension. Right, down the column—the Sparks-Thorne engine, showing the oil cooler below the radiator; Ted Horn's job was powered with an 8 cylinder Miller; Lou Meyer's engine had a built-in supercharger and the front transverse spring was moun'ed on an outboard hanger.



(Continued from preceding page)

fight off some pretty stiff competition from Kelly Petillo, who had been driving with a heavy foot and was following closely behind Snyder and Roberts. After 250 miles, however, Kelly's engine gave up the ghost and he was all through.

Shaw managed to get up into third place and then found that Chet Miller had slipped by when he wasn't looking. So, it was Shaw and Miller battling it out for second place, with Miller having the lead by a slight margin and both cars running in the same lap. Shaw's luck was in, however, and Miller was forced into the pit on his 194th lap to take on gas. Shaw went in to take second position, and although Miller was out again in a matter of seconds, he was unable to overtake Shaw so had to be satisfied with third place when the checkered flag waved at the end of the 500 miles.

What had been a bright, warm day suddenly became overcast and when the fifth place winner crossed the finish line, the heavens opened up and the rain came down in torrents. The officials immediately stopped the race, awarding sixth to tenth positions to the cars still running, according to the number of laps covered up to the time the race appeared.

It was a fast race all the way,

and marred by only one serious accident. Emil Andres, driving an Elgin Piston Pin Special, broke a wheel on the southeast turn, hit the retaining wall and completely wrecked his car. Andres was injured, but not fatally.

Burd piston rings were found on the winning car, and on car No. 38, which finished in fifth place. All other cars were equipped with Perfect Circle rings. Champion spark plugs were generally used, the only exceptions being Lou Meyer's car which had Bowes plugs, and Maserati driven by Mauri Rose, which had Bosch plugs. All magneto

equipment was Bosch except the Swiss Scintilla used on the Maserati. Packard cable was used on all cars except the Maserati.

Eight cars entered for the race were equipped with superchargers, but only one of the first ten to finish had a blower. Four of the first ten cars were front drive.

Lifting the ban on the quality and quantity of gasoline that could be used gave the boys free rein to select the fuel that performed best in their particular engines. Fuels were a blend of gasoline and tetraethyl lead, averaging about 80 cc

(Continued on page 40)

Graduate to the Profit Class

Use advertising as a common sense investment—not a luxury

WE were having a sandwich and a cup of coffee a short time ago with the advertising manager of one of the best known automotive service organizations in the country when the radio in the place suddenly blared out—

"It don't mean a thing if you ain't got that swing."

"Listen to that!" he exclaimed, "change the words of that song a bit and you'll have exactly what we're talking about." We were talking, by the way, about advertising in the automotive service business.

"You can't sell a thing if you don't bring them in."

"There's the service man's theme song," he declared. "If you can get service men to humming that to themselves, thinking about it and acting on it, you'll give them the answer to their biggest problem—how to convert more of the passing traffic into drive-in customers."

"You know," he added, "in spite of all the things that have been said and written about advertising, many men in business for themselves still look upon advertising as a luxury—as something they would like to do if they could afford it."

"And that's the trouble. Because it is thought to be a luxury it's usually the last thing that's bought—or it's bought only once in a while without any particular planning, usually when some super-salesman high-pressures them into something. That kind of advertising is a luxury. It's worse than that—it's an absolute waste."



BY AL LAANSMA
Editor, Motor World Wholesale

"Real advertising — productive advertising—is an investment even though it's usually labeled an expense by the bookkeeper."

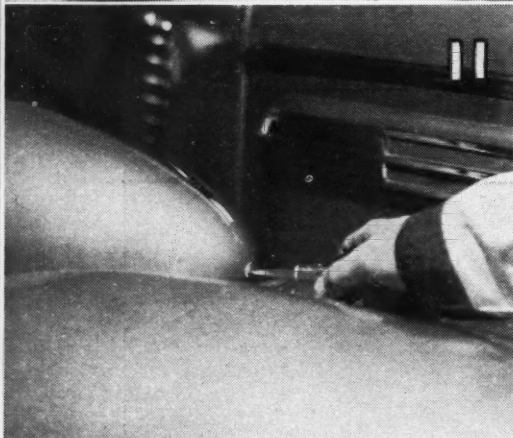
"It's just as much a necessary business investment as rent, or heat, or electric current. You can't get business without it. You can't

sell a thing if you don't bring them in. Every shop, no matter how big and busy it is now, wants more business. The only way it can get more business is to influence more car owners to drive in. Once they're in you have a chance to sell them

(Continued on page 47)



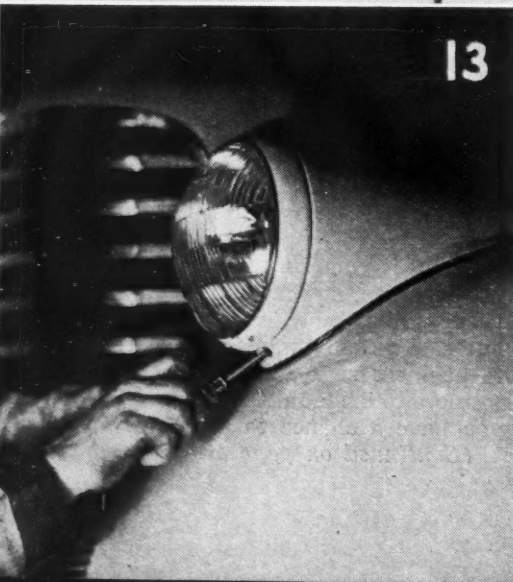
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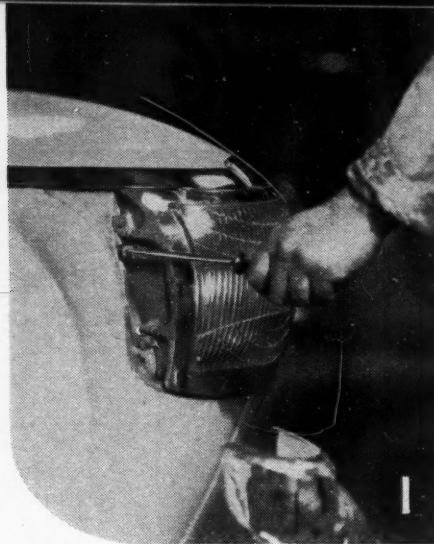
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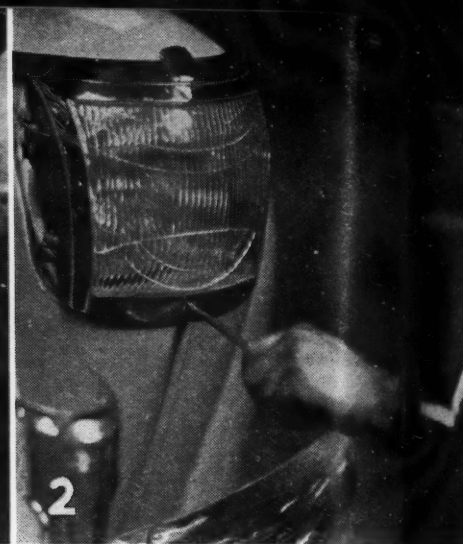
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13



1



2

MORE LIGHT ON

Aiming the beam of the 1938 headlight is easy when you know how - - here's the dope, continued from last month

1. GRAHAM-PAIGE—Remove the chrome plate on each side of the headlamp to uncover the screws for adjusting the reflector from side to side.

2. GRAHAM-PAIGE—The screw beneath the lens is for the up and down adjustment of the reflector.

3. STUDEBAKER SIX—The complete headlamp is moved to aim the beam. Loosen the mounting stud underneath the fender to loosen the lamp.

4. STUDEBAKER PRES. & COMMANDER—Side to side adjustment is by means of a screw (either with screw driver slot or square head) located in the side of the headlamp body.

5. STUDEBAKER PRES. & COMMANDER—Vertical adjustment is controlled by the adjusting screw in the rear of the headlamp body.

6. LINCOLN-ZEPHYR—Remove the headlamp rim by taking out the screw at the bottom and prying off the rim. The adjusting screw at the top of the lamp controls the vertical movement of the reflector.

7. LINCOLN - ZEPHYR—An adjusting screw on each side controls the side to side movement of the reflector.

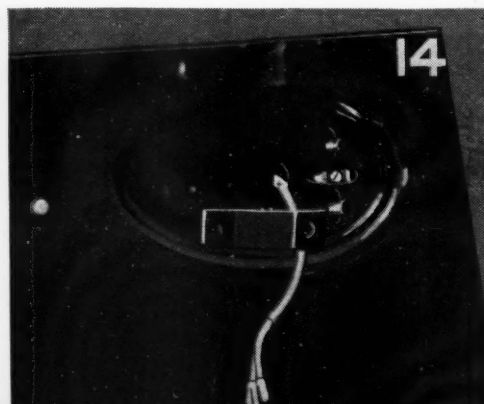
8 & 9. HUDSON SIX & EIGHT, AND HUDSON TERRAPLANE—Two screws, one on each side of the bottom of the lamp body, control both adjustments. Reflector is hinged at the top. Moving both screws an equal amount in or out tilts the reflector up and down. Moving one screw at a time tilts the reflector from side to side.

10. CHRYSLER AND DE SOTO—Adjustment from side to side is by means of a screw in the side of the headlamp body toward the radiator.

11. CHRYSLER AND DE SOTO—The vertical adjusting screw is located in the rear of the headlamp body.

12. OLDSMOBILE, CADILLAC & LA SALLE—The lateral adjusting screw is reached by prying off a button on the side of the headlamp body.

13. OLDSMOBILE, CADILLAC & LA SALLE—The vertical adjustment is by means of the screw in the front of the light, beneath the lens.



14



15

N LIGHTS

BY
BOB HANKINSON

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14. NASH & NASH LAFAYETTE—Raise the hood and loosen three headlamp mounting stud nuts to aim the lamp up and down.

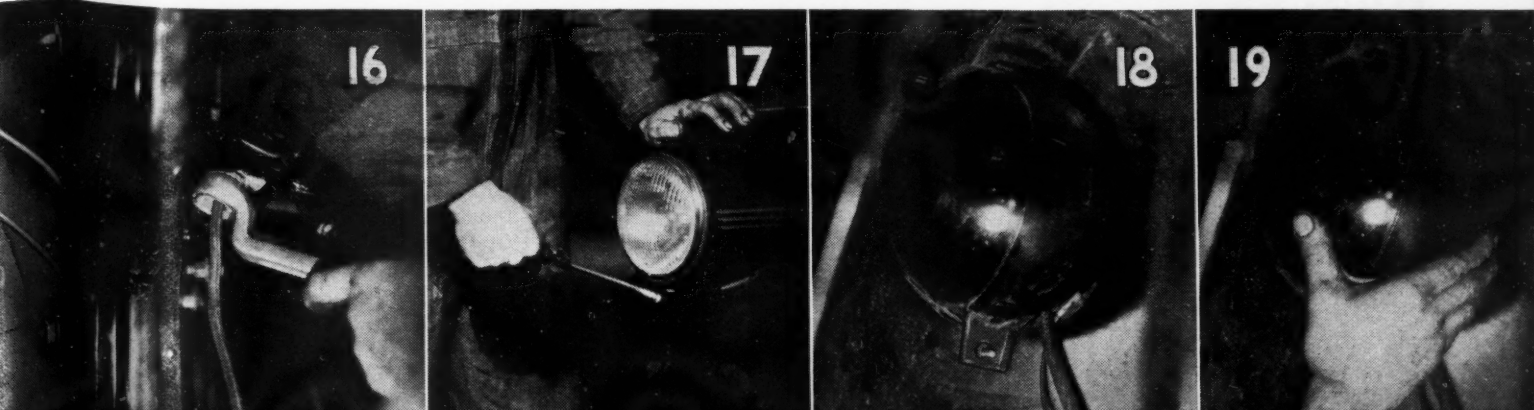
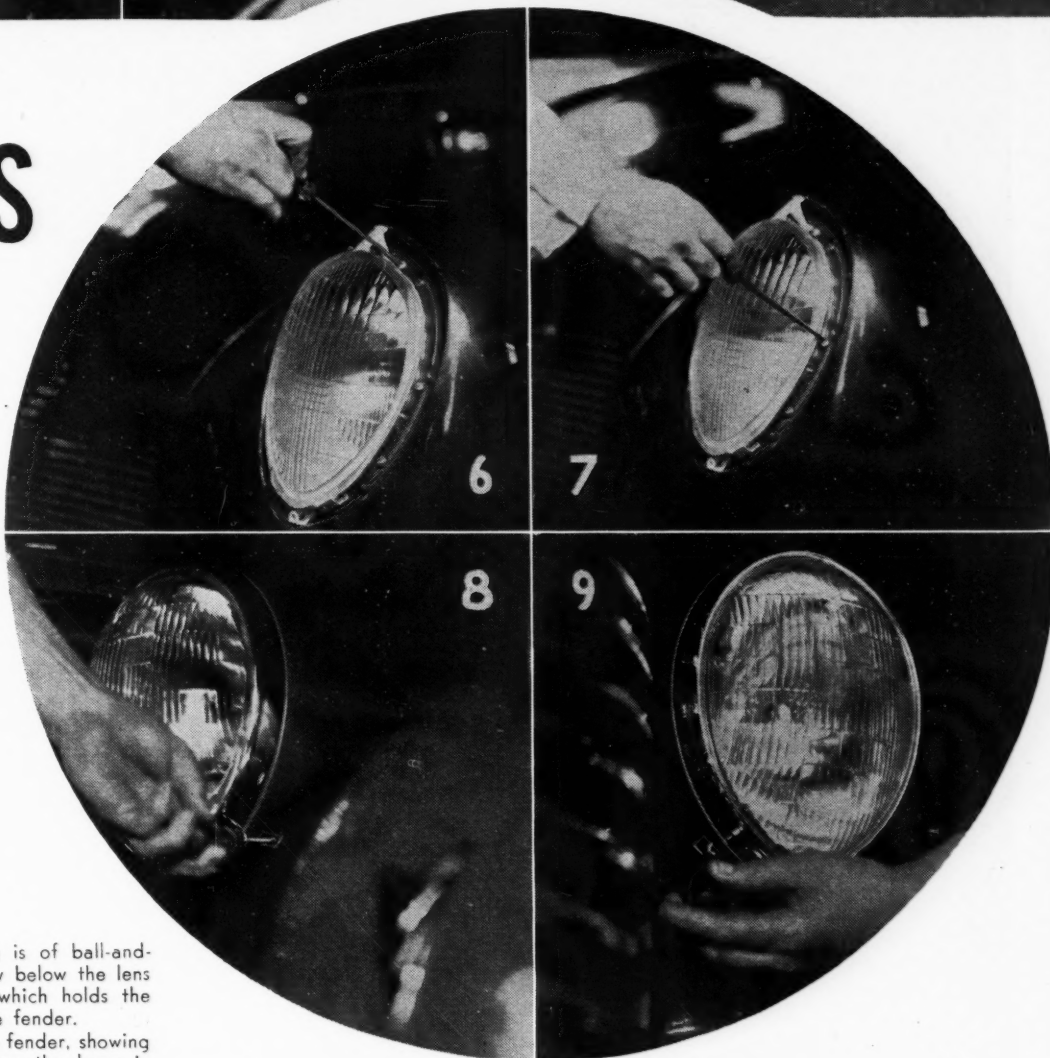
15. NASH & NASH LAFAYETTE—Lateral adjustment of the reflector is by means of a screw reached through a slot in the grille side panel, beside the radiator core. Raise the hood to reach this adjustment.

16. PACKARD—The complete headlamp is moved to aim the beam. Loosen the mounting stud nut underneath the fender.

17. WILLYS—Light and mounting is of ball-and-socket type of construction. Screw below the lens is a clamp screw for the band which holds the lamp in place in the socket of the fender.

18. WILLYS—View from under the fender, showing the clamp screw and band holding the lamp in place.

19. WILLYS—With the band loosened, move the lamp body to aim the beam.





(Top) Main office and plant at Philadelphia (Center) Crescentville, Pa., plant (Lower) Original building in Gloucester, N. J., started 1898.

Exide's 50 Years of Growth

Golden Anniversary emphasizes development under American System

THE Electric Storage Battery Co., manufacturer of Exide batteries, began this month to observe its golden anniversary year.

The history of the company is typical of American enterprise and is an illustration of the possibilities that lie in the American system where individuals with brains, initiative and energy can develop a small business to one of colossal size, shipping products to the four corners of the world.

The company was founded in June 1888 in a small one story brick structure near Gloucester, N. J., which was not any larger than a small repair shop. From that modest beginning it has grown so that today, its plants provide 30 acres of space for manufacturing Exide batteries and employment for thousands of men.

Engineers and business men in those early days of the company were frankly skeptical of the storage battery and progress was slow. But as the company demonstrated the value of its product, its business grew along with the electrical industry, which had just entered the period of expansion.

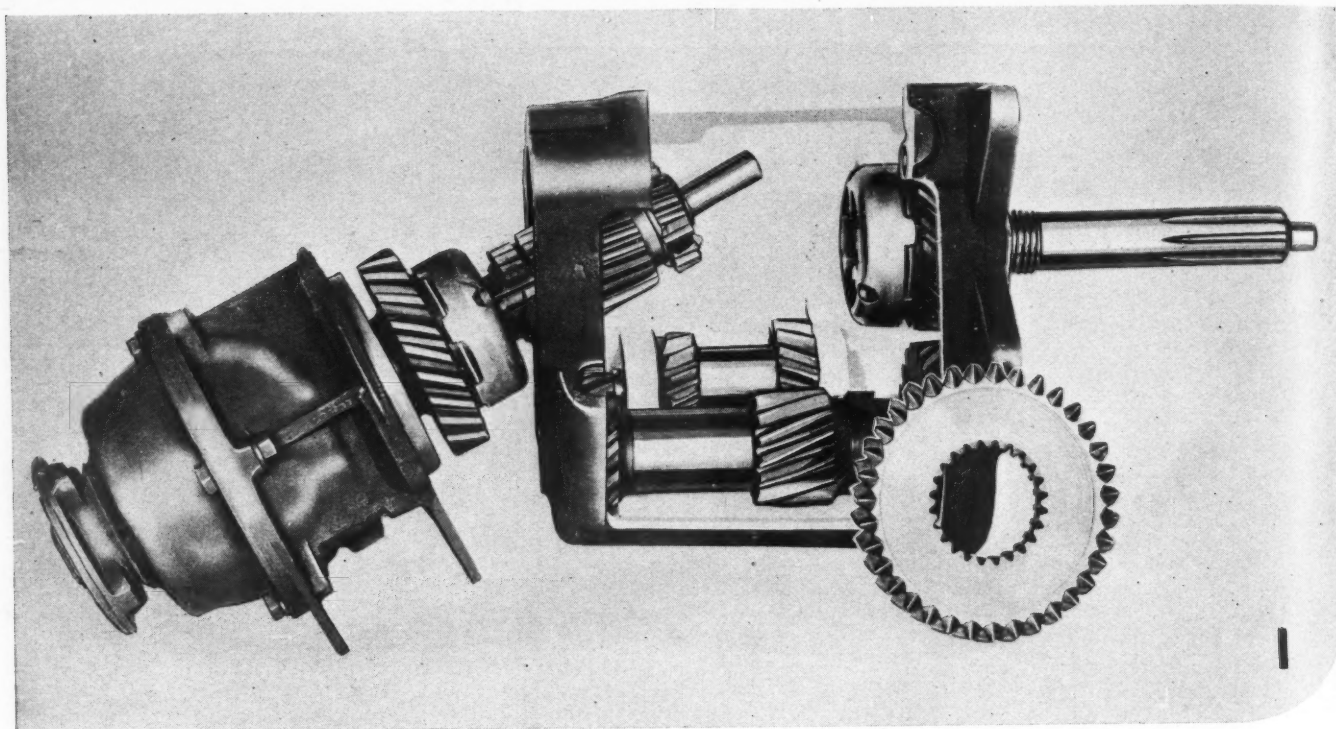
The original small building was soon to become too small and additional space was found necessary in a nearby factory building. In 1894, however, the "works" was moved to the first floor and basement of its present building, at 19th St. and Allegheny Ave., in Philadelphia. Additional floors were added until in 1904 the entire group of buildings were acquired. In 1911 another building was added to the group to be followed by another in 1917.

Two years later, a 40-acre tract of land was purchased at Crescentville, on the northeastern edge of Philadelphia, and what is now the most modern battery building plant in the world was erected. At this plant raw material enters one end

(Concluded on page 48)



"My doctor put me on a liquid diet!"



“Servicing Buick

Easy if you know how—

SERVICING the transmission on the Model 40 Buick is not difficult, and 7.3 hours is required to do the job according to the Buick flat manual. The factory procedure for doing this job is as follows:

First drain lubricant and then flush by filling with kerosene and run transmission in neutral for about 15 sec. Then drain out the kerosene.

Before removing the transmission it is necessary to remove the rear axle assembly. This is accomplished by raising the rear of the car with a hoist. Then remove front floor boards and disconnect parking brake at equalizer and remove parking brake conduit from lower side of torque tube. Disconnect hydraulic brake line at rear end of torque tube rubber hose connection.

Also disconnect rear shock absorbers at lower end and the rear radius rod at the frame end.

The rear coil springs should then be disconnected at the lower end and so as to be sure that the springs do not damage the brake lines, tie the lower ends of the springs to rear bumper.

Then disconnect front end of torque tube from universal ball joint and then after raising the rear of the car to obtain sufficient clearance, the rear axle can be rolled out from under the chassis.

With the rear axle out of the way remove the transmission support and steady rest rod, taking care to wire the shims to each end of the support so that the correct number of shims will be reinstalled on each side when reassembled.

Next remove one of the cap screws securing the transmission to the flywheel bell housing and replace it with a guide pin. Then replace the other cap screw with a guide pin, and then remove the bolts holding the bottom of the transmission case to the flywheel housing. Guide pins must be used, otherwise, the clutch hub will be distorted and poor shifting will result. With the bolts removed the transmission can be pulled out.

The next step is to remove the transmission cover, the interlock plates, shifter shaft springs and balls, shifter shafts and forks. Remove rear bearing retainer cap screws and turn retainer assembly so that section covering rear end of counter gear shaft will allow removal of the shaft. Drive counter-

1. Removing transmission end plate assembly.

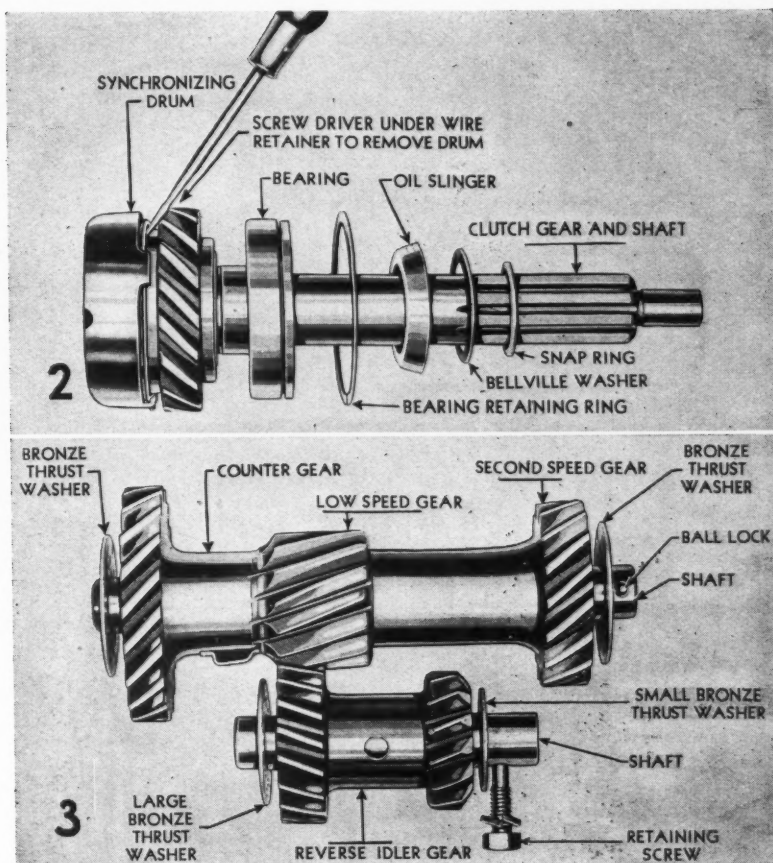
2. A wire retainer is used to retain the drum on the clutch gear.

3. Note location of thrust washers on counter gear assembly.

4. Transmission main shaft assembly.

5. Synchronizing cam surfaces.

By
BILL TOBOLDT



Transmissions"

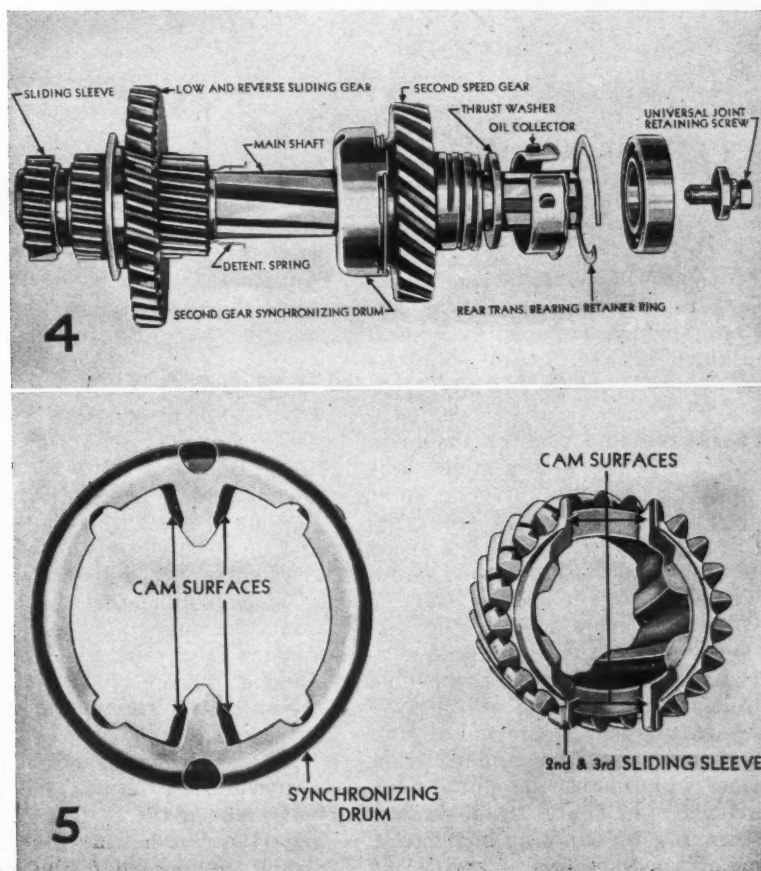
and here's how

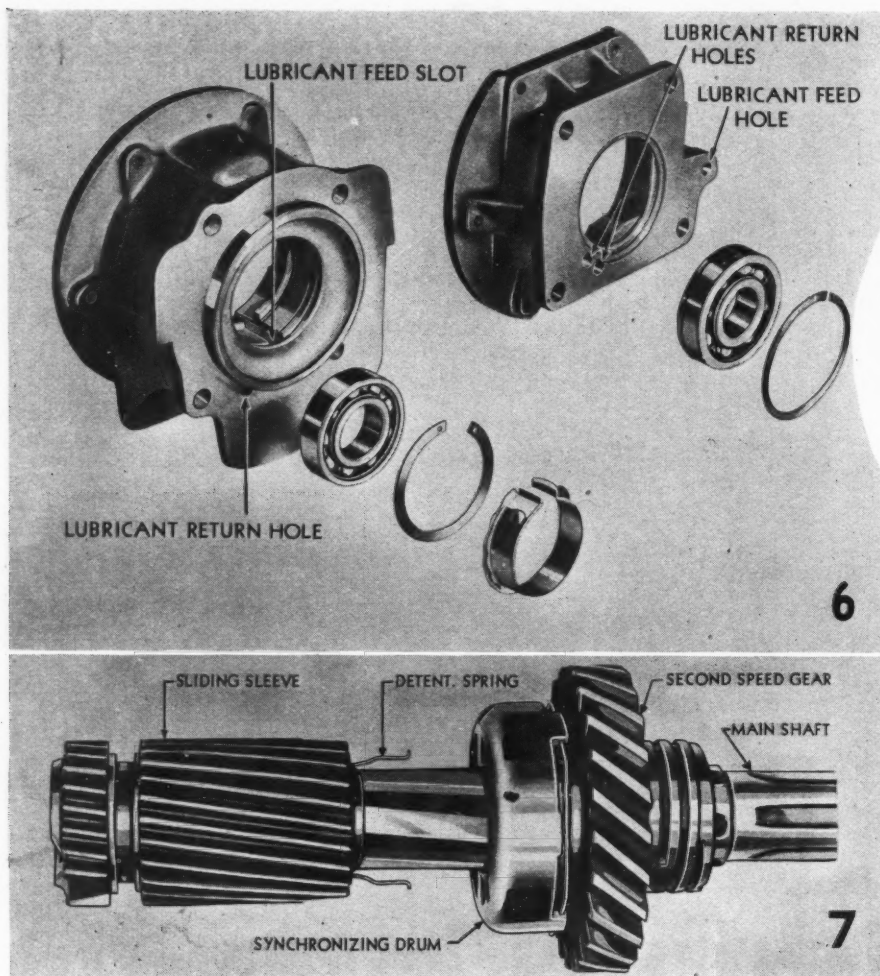
shaft out rear of transmission, taking care not to lose retaining ball in rear of counter gear shaft. Incidentally, all main line shaft parts can be removed from the transmission housing without removing the countershaft assembly if desired.

Remove the universal joint ball and end plate assembly from the back of the transmission. While removing this assembly hold the low and reverse speed gear as it will not pass through the back end of the case. Fig. 1.

Following this, remove the clutch gear bearing snap ring and tap the gear out through the back of the transmission case. The counter-gear cluster can then be lifted from the case.

The idler gear shaft, idler gear
(Continued on next page)





6. Rear bearing retainer.

7. Second speed gear.

8. Synchronizing drum and wire retainer.

(Continued from preceding page)
and thrust washers can be removed after taking out the lock screw at lower left rear corner of the transmission case.

To disassemble the second speed gear, remove sliding sleeve and detent springs from splined shaft as shown in Fig. 7, and then the second speed synchronizing drum by prying wire retainer over edge of synchronizing cone as shown in Fig. 2. Next disassemble universal ball, remove universal joint using a puller. Remove transmission rear bearing. The second speed gear may now be removed from the rear end of the splined shaft.

To disassemble clutch gear assembly, remove the high speed synchronizing drum by prying the wire retainer over the edge of the synchronizing cone. Next remove the lock ring, oil slinger and Bellville washer which holds the clutch gear bearing on the shaft. Then remove the bearing by bumping shaft on a block of wood or piece of lead.

This completes the disassembly of the transmission. When reassembling reverse the procedure taking care that the gear teeth are not nicked as such nicks will cause a knock. Also nicks in either bronze or steel cones will prevent proper synchronization of the gears.

The synchronizing cones should have $1/32$ in. end play and should show heaviest contact on their large diameter to give best synchronization. The sliding sleeve on the main shaft must slide freely and be resisted only by the normal friction of the detent springs.

To determine the location of the synchronizing unit when the transmission is in neutral and the cover removed, press down on the retainer ball of the second and third speed shaft.

From the neutral position of the synchronizing unit, the forward movement of the shifter ring to engage the clutch gear cone in high, should be less than the rearward

movement, to engage the second speed gear cone, preventing drag between the second speed gears which would cause a noise when the transmission is in neutral.

Never polish or change the angle of the bronze cones. However, steel cones may be smoothed up with fine emery cloth and finished with polishing cloth. Scored steel cones will result in synchronizing action that is too severe. Always install new snap rings to eliminate the possibility of the old ones failing after the transmission is in service.

Proper fit of the sliding sleeve on the main shaft is a selected matched fit made during manufacture. The low and reverse gear fit on the sliding sleeve is also selected. These parts are, therefore, serviced only as a unit.

Another point to observe when reassembling the transmission is the location of the thrust washers. These should be replaced as shown in the illustration.



Holcomb and McClintock's shop and service station was a fine looking outlet before any alterations were made.

Spending \$14,000 resulted in the attractive location shown below and increased profits considerably.



BY

A. V. DuCHANE

Remodeling For Profits

REMODELING their service station eight months ago, at a cost of \$14,000, has resulted in a gain of 75.3 per cent in sales for Howard Holcomb and O. C. McClintock, San Bernardino, Calif.

This increase in sales is noticeable through all their departments, which include accessories, tires, batteries, gasoline and lubrication, garage, and radios, as well as a cafe. The station is located on the main artery to the San Bernardino Mountains, and is kept open 24 hours a day for the convenience of these many motorists.

Numerous cupolas dotting the new station are lighted, while the station buildings are brightly illuminated, and in addition two 70-ft. poles each support two 5000 watt spot lights which may be seen for many miles. Holcomb and McClintock have found that motorists traveling at night like to drive into well lighted stations rather than into a station in which concealing shadows lurk.

This station takes up an area approximately 125 ft. wide and 150 ft. long. Three buildings house the station which is constructed of

stucco in colonial design. All the buildings are painted white with green roofs. The glass enclosed station proper is on the corner. This houses the gasoline pumps, lubrication department, air, water and oil tanks. The two buildings in the background house the service department and cafe. Five 550-gal. tanks and two 1500-gal. tanks store gasoline for the station which handles exclusively the three general brands. The floor consists of a seal-coat, with oil, rock and sand over it.

(Continued on page 59)

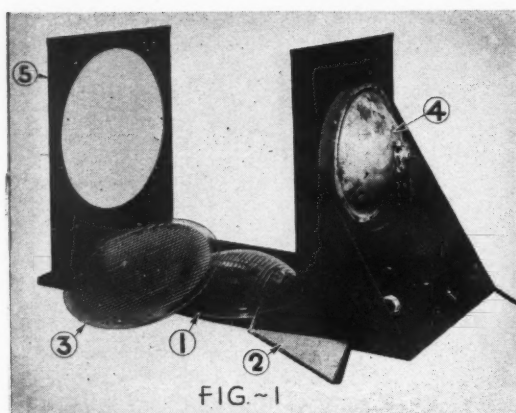


FIG. 1

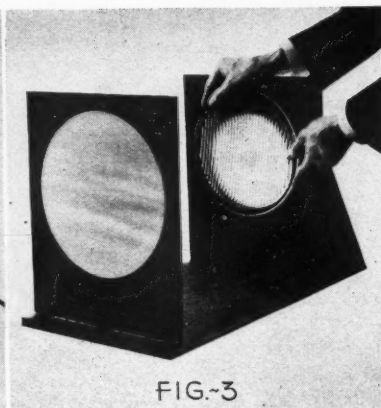


FIG. 3

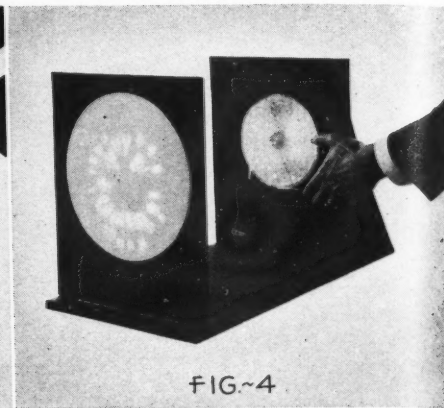


FIG. 4

“Millions of Mirrors”

Experiments at the General Electric plant reveal the importance of clean reflectors and unblackened bulbs

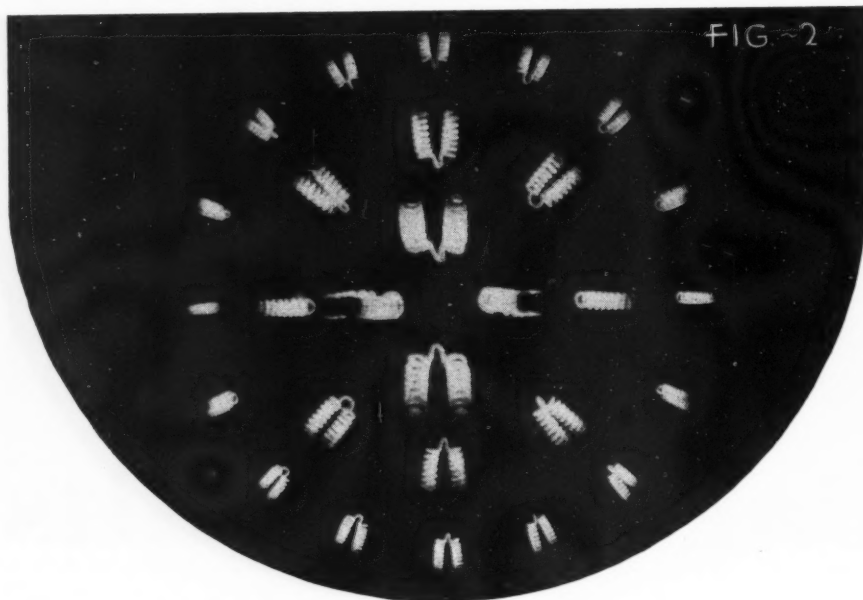


FIG. 2

THERE is a lot of engineering in the modern headlight. Just how complicated a subject this is, is emphasized by a visit to the General Electric Company at Nela Park, Cleveland, Ohio. Here all the many phases of headlighting are undergoing constant study and experimentation.

One recent experiment discloses the importance of the reflector, its shape and the condition of its re-

flecting surface. The equipment used in making the experiment is shown in Fig. 1. Here, a headlight reflector (4) directs its beam toward a screen (5). On the base of the instrument is shown a prism of glass (2) and a disk of fluted glass (3) which compose a headlight reflector (1). In front of the reflector is a frame for holding sheets of opaque paper.

By punching a small hole through

the sheet of opaque paper in front of the reflector a reflection of the filament image is projected on the screen. Fig. 2 illustrates what is shown on the screen when a series of such holes are punched in the opaque sheet so as to form a symmetrical design. In other words, every minute area of the reflector acts as a tiny mirror, reflecting the image of the filament in parallel rays to the lens.

A headlight beam is actually composed of many thousands of such images, and if any portion of the reflector is dirty it will reduce the strength or intensity of such images. In other words, the amount of light thrown on the road will be reduced. If the reflector is dented, the images will, of course, be distorted and weakened.

Spots on the reflector absorb light rather than reflect it. Blackened bulbs, also absorb light, preventing it from reaching the reflector.

When the sheet of fluted glass is held in front of the punctured paper, the images on the screen will be spread as shown in Fig. 3. The flutes in an actual lens spread the light in a predetermined pattern, scientifically arrived at by lighting engineers. An inferior bulb would distort the rays before they reach the lens, and the predetermined pattern would be destroyed. When the prism is held in front of the punctured paper, it will bend the light rays up or down. In Fig. 4, the glass prism has lowered the bottom filament images.

Every part of a headlight has a specific job to do. This task can only be performed properly if the lens is clean, the reflector highly polished and the bulbs accurately made and free from blackening.

A Letter from W. C. Condit

160 Franklin St.,
Bloomfield, N. J.

Mr. W. K. Toboldt, Editor,
Motor Age Magazine,
Philadelphia, Pa.

Dear Sir:

I have been a reader of your magazine for a long time and have had considerable respect for your statements and opinions.

However, after reading your article on "Performance Requires Perfect Timing" in the March issue of MOTOR AGE, I have come to the conclusion that either you have been giving one of your star advertisers a "break" or have been listening to and looking at some smart sales propaganda for high priced gasolines.

Having been engaged in the automobile and tune-up business for most of the past 12 years, I have had opportunity to observe certain things. From what I have noted, I believe that a subscription to a good Oil Trade Journal, of which there are several, would show you where your latest article has made some errors.

In the first place, you state that "To get the most out of today's high compression engines it is necessary to use fuel having an octane rating of 80 or better." Well, it is easy to bandy a lot of loose talk around about 80 octane gas—but where are you going to get it? If you will refer to National Petroleum News of Feb. 16, 1938, you will see the latest survey by the U. S. Bureau of Mines and the C.F.R. Committee. This interesting set of data shows that premium gasolines throughout the U. S. A. ran from 81.9 down as low as 71 octane, and averaged about 77 octane. From another source of information, I am willing to bet you some cash money that if you and I walk down any street in New York, or Philadelphia for that matter, and you point out the first five brands of major gasoline that we come to, not over two of them will have a gas of 80 octane; by analysis at Saybolt & Co. by the C.F.R. (Motor) method; I will bet you the cost of the analyses, and that will be a tidy sum, as perhaps you know.

Second, awhile back you, or at least your magazine, pointed out that a good mechanic tried to get "par" performance out of an automobile; not to attempt to make the average customer's car do tricks that it was never designed for. It seems that now you have a different idea. At any rate, I question your statement that "Factory markings or specifications are only approximate. Road testing is little better."

Surely you are acquainted with the typical curve, of spark advance vs. horsepower, which is plotted by every engine builder in order to establish the proper spark setting, and also the automatic advance which the distributor must furnish. You must know, then, that such curves always pass through a peak, beyond which any further advancing of the spark results in loss of power, and frequently makes the motor very "rough" in the bargain. Mr. R. N. Janeway, of the Chrysler Corp. engineering department, who is probably the leading combustion expert in the industry, mentioned to me at one time that they run their spark advance vs. B.H.P. curves with gasoline of about 85 octane (not a commercially available gas) purchased specially for the purpose, and this eliminates any question of knock or ping entering into the determination of the curve. I happened to have the job of running these same curves for an automobile company for whom I once worked, also ran a number of them while in the laboratory of the Standard Oil Co. a few years ago, so they are very clear in my mind. In determining these curves, it is obvious that (1) when near the peak, variations of a few degrees gives very slight changes in power and (2) a slightly retarded spark is generally to be preferred to excessive advance, for both

will yield the same power, but the excess advance will give roughness, poor idling and unless a gas of unnecessarily high octane rating is used, will result in ping. Before the advent of vacuum controlled distributors, the excess advance did help part-throttle economy, but with this device on modern cars that advantage has vanished. Anyway, economy and high-priced fuels do not belong in the same category at all, do they? Since "premium" fuels run from two cents per gal. and more, above "regular" gasoline, their cost is from 10 to 20 per cent higher than the regulars, and cannot possibly be justified on a mileage basis, since it is common knowledge that they give just the same mileage, no more and no less.

It happens that I know of a mechanic who has put his faith in setting ignition timing by use of a tachometer—and a good one; which is just what you advocate except that his instrument is much more accurate than the modern speedometer. He was sadly surprised in several instances, to have customers bring jobs back and complain that even ethyl gas was pinging, after he had "correctly" set their timing by exactly the method you advocate. The trouble is, the system isn't sound; it isn't scientifically correct, and why should it be? Can you tell me WHY? Why should it work?

Having encountered several cases of equipment salesmen making claims for accurate timing by a vacuum gage, I wrote to the Delco Remy Co. As the largest makers of ignition equipment, I thought they would have a pretty good idea of the correct way to set timing. They kindly replied that a timing light, or a neon lamp, was O.K. Undoubtedly the most accurate method, and that employed when manufacturing an engine, is to use a micrometer "dial indicator."

I might add that the Delco Remy discussion states that a road test is the only final and positive satisfaction, with which I heartily agree. Do you think you could persuade a race driver to enter the Indianapolis race with a car, even if set on a dynamometer, that he had not tried on the track first? I happen to have been a dynamometer operator for several years. While it is the finest thing in most ways, it still lacks some points of real practical road work. The heat, for one thing, can't be controlled without running fresh water in by a hose. Just set a car on a chassis dynamometer, run it at 60 m.p.h. full throttle, and see if it can cool itself. At Standard they have a 50-hp. blower to give the effect of wind on the road; even with that the cars boil, because no amount of breeze in front gives the cooling effect of the suction, etc., that helps on the road.

Finally, why all the zeal to help sell ethyl gas? Are you getting into the oil game, or what? You write, "To sell the use of Ethyl or high octane fuels . . ." Well, why sell the customer on using them? MOTOR AGE is, presumably, for the Independent repair shop—or so it claims to be. It isn't the "Gasoline Retailer": which, incidentally, showed a while ago that the sale of premium gasolines in the whole U. S. A. run around 4 per cent of the total gasoline sold.

The statement that "fuel of 80 octane or better" is necessary for maximum performance, does not agree with the published statements of most of the leading automobile makers. Let's take the 1937 cars, as the '38 models are largely still being serviced by their own dealers, I assume. Buick states that the little car "Series 40" is set for "70 octane, regular gas," and the bigger motors, 60, 80, 90 series, for 75 octane "which is approximately the rating of the ethyl or hitest gasolines." Cadillac 8 and LaSalle say "The engine is designed for 70 octane gasoline, however, gas of lower rating may be used by adjusting . . ." That

from Cadillac, G. M.'s highest priced car, on p. 52 of the Owner's Manual. Pontiac makes similar statements; Ford and Zephyr are built for "regular" gas and I have curves from the Chrysler laboratory in my hand right now, showing maximum horsepower on 70 octane gasoline.

I'm going to wind up this badly organized message. I happen to be engaged, 6 days a week, in trying to satisfy car owners that they can get very satisfactory pick-up, speed, power and maximum economy from regular priced gas, and I am able to satisfy at least 90 per cent of them. I use a stop watch to check acceleration, so we don't guess at "good pick-up." I am able to try for my results, and usually get them, because I learned on engine- and chassis-dynamometers that when an engine is built to require a gas of a certain octane rating, it is useless to try to get more power out of it by a higher octane gas or by setting the spark too far ahead. On the dynamometer, the regular and ethyl gases show exactly the same horsepower, except in a few engines such as Cadillac "16" etc., which are really built for special high octane gas, and appreciate it. Here's a thought for you; when I was in that engine lab. not one single man who worked there, testing various fuels on dynamometers, ever used the ethyl gas in his own car. Why? I wonder.

In 1935 the Ethyl Corp. printed an "Auto Question & Answer Book." If you can get a copy, read pp. 13 and 14. You will find that much of what I have stated is "checked" exactly by that book. Only they advocate ethyl gas to cure a carbon ping. I feel that the repair man is cheated, thus, of his carbon jobs, which cost a car owner less in a year than the premium fuel does. Who do you want to get the money; the mechanics or the ethyl people?

Yours truly,
W. C. CONDIT

SHOP TALK

(Continued from page 9)

chance to try that yet but will do so at the first opportunity. Meanwhile, if anyone has the time to try it on a couple of jobs, I'd like to know the results. Cal continues by saying that the timing procedure leaves the motor in a very satisfactory state of performance.

More Ring Jobs

Was very much interested in a letter from Charlie Roberts who has a shop in Keokuk, Iowa. Keokuk is a town of about 15,000 and has 12 car agencies and 15 independent shops. Charlie has one mechanic in addition to himself and, in addition to a lot of other work, turned out 41 ring jobs in a year's time. That's a swell batting average, says I, especially when you consider the size of the town and the competition. How many of youse guys can equal his record?

Bill Toboldt

Service Hints

from

The Factories

Flushing 1937-38 Pontiac Radiators

The ordinary methods for flushing the radiator and engine on past Pontiac models with the use of city water pressure or compressed air and water should not be used on 1937-38 Pontiac cars equipped with the packless type water pump. The reason for this is that high pressures will force the carbon washer away from the face of the impeller, permitting solution to be blown into the ball bearing.

The radiator core only should be flushed on cars which are equipped with the packless pump. To do this the radiator hose should be disconnected from the engine at top and bottom.

Passenger Car Throttle Lever Spring

In case of sticking throttle on Chevrolet cars, first check the alignment of the throttle rod and the floor board grommet and the clearance between the exhaust manifold and carburetor to accelerator rod. If these are found to be O.K., it may be necessary to increase the tension of the throttle lever spring. This can be done by removing the throttle lever spring and cutting off the wire to the first coil on each end. Reforming eyes on each end of the spring will result in increasing spring tension one pound. Reworking this spring in the manner described will not create excessive throttle pressure.

Transmission Slipping Out of High Gear — 1938 Studebaker Models Equipped With Transmission Vacuum Control

It has been found that in some cases the movement of the engine, on deceleration or brake application, will result in interference at the start-



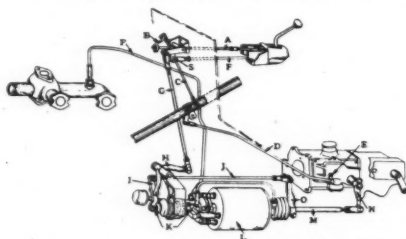
"The finance company was here about our automobile again today!"

er motor and the vacuum control bell crank ball joint stud and nut and move the vacuum control out of high gear engagement. Additional clearance can be obtained if the standard heavy type lock washer and ball joint stud retaining nut are removed and replaced with a shakeproof type lock washer and a thinner retaining nut of the lock nut type. The thinner washer and nut are available through any Parts Depot and the part numbers are as follows:

Part No.	Part Name
84 x 46	Lock Washer
22 x 183	Nut

As an improvement a spring part No. 127485 and clip part No. 193666 are being installed in cars in production and should be used in service as a correction to prevent the transmission on vacuum control cars from slipping out of gear.

The clip is placed above the nut on



the rear bolt of the right radiator brace rod, positioned with the small hole for spring attachment toward the right side. The spring hooks into the hole in the clip and the other end is hooked on the ball stud of the dash bracket shaft inner lever (lever "F", illustration 54 in the 1938 Shop Manual).

The clip should be positioned so that with the control in neutral position the spring follows the center line of the lever to which it is attached.

Before installing the spring the adjustment of the controls should be checked and any necessary corrections made. If installation of the spring should not correct the condition, it will be necessary to replace the entire cylinder and valve assembly.

Front Wheel Lower Control Arm 1937-38

The 1938 Master Parts Book lists part numbers 231995 and 231994, front wheel lower control arm (group 6.168) for replacement on 1937 and 1938 Pontiac cars. These are the 1938 type arms using the replaceable steel bushing and rubber seal and should be



Expert motor tuners adjust tappets to exactly the right clearance at the Pontiac plant while engines are getting the running-in test. Thickness gauges of thin strips of steel and of exact thickness are used to set the valves at the proper clearance.

used in all 1937 and 1938 replacements.

If this type arm is to be used on a 1937 car, the steel bushing 231997 and rubber seal 501598 should also be ordered.

Chevrolet Overflow Tank

An overflow return tank, Chevrolet Part No. 985319, has been released by the Chevrolet Parts and Accessory Dept. for installation on any passenger car and truck. This new overflow return tank collects any water or anti-freeze that might be lost through the radiator overflow pipe. When the overflow return tank is functioning, the vapor in the cooling system is taken into the tank through a hose connecting the overflow pipe of the radiator core to the outside pipe at the bottom of the return tank.

Studebaker Hard Starting

In the event a condition of hard starting on a Commander Model 7A and straight Commander Model 8A is called to your attention, a careful check of the carburetor choke valve clearance should be made. In some cases because of a minimum amount of clearance at the carburetor choke valve when in an open position, the metal in the carburetor body contracts and causes the choke valve to stick. This usually occurs only in cold weather. A correction can be made by tapping the throat of the carburetor with a light hammer at a point just above the carburetor bowl and in front of and below where the carburetor valve shaft comes through the throat of the carburetor, until a slight amount of end-play in the choke valve shaft is felt.



THE READERS' CLEARING HOUSE

of

Service Men's Queries

BILL TOBOLDT, Editor of MOTOR AGE, conducts the Readers' Clearing House. He presents some of the thousands of questions asked by readers of MOTOR AGE together with a practical analysis of the difficulties in his replies. You, too, are cordially invited to send us your problems.

BUCKING BUICK

We have in our personal use a 1931 Buick, Model 8-57—2nd Series. This car is driven for all purposes and is used for pleasure too. This car has a bucking in it after you slow down below 10 m.p.h. especially when you are going down grade and let up on your foot feed. Then, when you go to press down on it again slowly it does buck. This car has had the valves ground by facing the valve and seating the block and then touch the valves up with compound before putting them back in the head. Tuned up motor by testing coil and condenser, filing and checking points and synchronizing points. Cleaned and checked carburetor and adjusted. Cleaned and adjusted plugs. Plugs adjusted to .032 points to .018.

About a month ago this car had a come and go in the motor and car at 35-40. But I have not been able to get it since I checked it and tuned it up the last time. But still had bucking.

This car has at present 48,500 miles on it and has never had rings. Bearings are not noisy nor does it use oil excessively — one qt. every 1000 miles. The compression seems to be fairly good. It seems to get about 15-16 miles per gallon of gasoline at 40 m.p.h. speed. Top speed is 68-70 m.p.h.

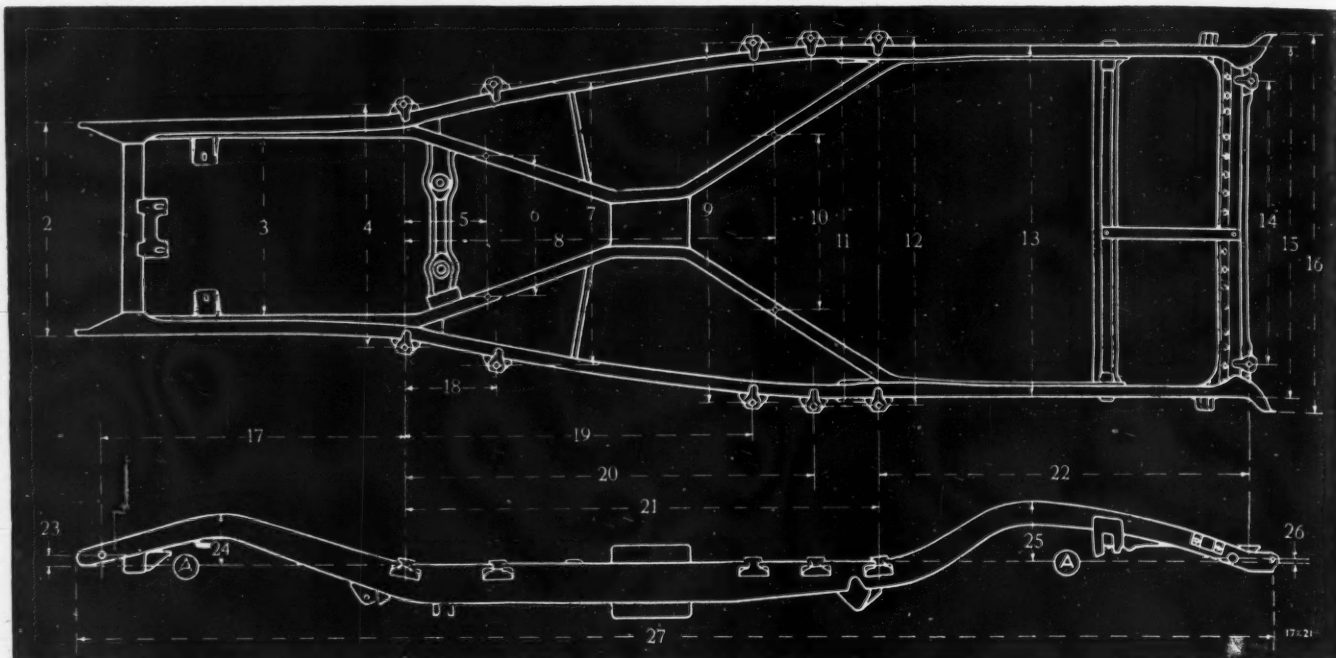
Readers' Clearing House is the first thing we read in Motor Age. John Shopp, Jr., 114 S. 19th St., New Castle, Ind.

THE spark plugs in this engine should be set with a gap from .025 to .030 inch and it may be that some of this difficulty you are having is due to the fact that you have increased the gap to .032 inch. I am inclined to believe, however, that the majority of the trouble is caused by improper carburetor adjustments. I suggest that you go back over the carburetor

and check it in the following manner:

Set the adjusting screw so that the end is flush with the end of the ratchet spring. Then, with the engine hot, turn the screw in until the engine begins to roll from being too rich. Then turn the screw out, counting the number of notches until the engine begins to falter because it is too lean. From that point, turn the adjusting screw back in $\frac{1}{2}$ the number of notches from the rich position and this should give you the correct setting for normal operation.

It is natural for an engine to have



A—Top line of frame
 2—29 11/32 in. (29 13/32 in.—7-Pass. sedan)
 3—24 1/2 in.
 4—33 5/16 in.
 5—12 11/32 in.
 6—18 13/16 in.
 7—38 9/16 in.
 8—52 1/2 in. (63 3/4 in.—7-Pass. Sedan)
 9—49 in.

Dodge 1938 Frame Alignment

10—23 3/4 in. (26 3/4 in.—7-Pass. Sedan)
 11—50 3/4 in. (50 7/16 in.—7-Pass. Sedan)
 12—50 7/16 in. (50 3/4 in.—7-Pass. Sedan)
 13—48 1/4 in. (48 5/16 in.—7-Pass. Sedan)
 14—38 3/4 in.
 15—48 1/4 in. (48 5/16 in.—7-Pass. Sedan)
 16—51 1/2 in. (51 15/16 in.—7-Pass. Sedan)
 17—41 3/4 in.
 18—12 11/16 in.

19—47 3/4 in.
 20—56 5/32 in.
 21—68 3/4 in. (85 5/8 in.—7-Pass. Sedan)
 22—51 5/32 in.
 23—1 23/32 in. (1 11/16 in.—7-Pass. Sedan)
 24—7 3/32 in.
 25—8 in.
 26—1 1/2 in. (15/32 in.—7-Pass. Sedan)
 27—167 29/32 in. (184 15/16 in.—7-Pass. Sedan)

a tendency to load up when the car is going down hill and you have your foot off the accelerator. When you step on the gas it has to clean itself out before it begins to take the new feed. This cleaning out process sometimes results in performance similar to a flat spot and this will be particularly noticeable if the carburetor adjustment is a little to the lean side.

Valve tappet clearance should be set at .008 inch with the engine hot.

HARD STARTING

I have a Wolverine Reo that will not start by using the starter. There is no spark when using the starter. When I crank it it starts fine. I have installed new battery, starter off another car that started the other car all right, new coil, condenser, points, rings, and ground valves.

I disconnected one set of points. It runs fine after I get it started. Also, how is the marking set on the timing sprockets. L. D. Bloom, Bloom's Garage, Saginaw, Mich.

ON your Reo-Wolverine that is giving you hard starting trouble, I would suggest that you run an independent ground from the distributor housing direct to the frame of the car, as I believe you have a poor contact somewhere in the primary circuit. In addition, I would suggest that you check the play in the distributor shaft bushing as it is quite possible that this is badly worn.

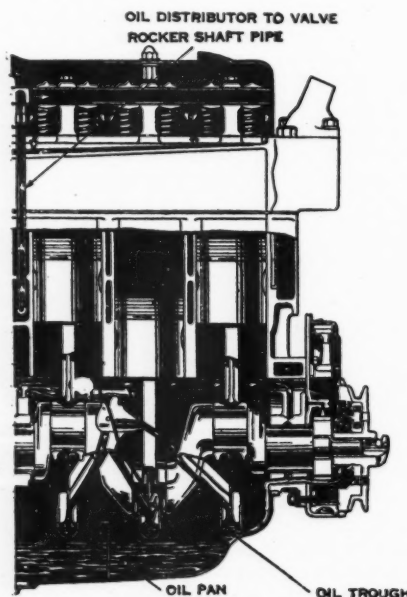
Another point to check would be the ground for the battery to make

sure that it is making a good electrical connection.

If your trouble continues after going over the items I have listed, I would advise the installation of new battery cables.

FRONT END LEAKS

I have found that 1933 Chevrolets that leak oil at the front end have worn the motor support so much that the fan pulley rubs. Welding a strip in the cross-member will raise the motor and stop the leak. Pennington Garage, Wauneta, Neb.



SHIFTING TROUBLE ON DODGE

We have in our garage a 1934 Dodge sedan in which we have had the clutch out and in twice and can not keep it from sticking. The pressure plate assembly has been overhauled and new clutch disk installed, even the transmission was checked over some. To explain, the action of clutch is like this:

I start the motor, put transmission in reverse—O.K. and back car out of garage into alley. Now when I try to shift gears into low to go forward, I can not get it out of reverse until I shut the engine off. Then I can shift gears, start the motor and go ahead. The car performs this way with any shifting of gears but not quite so bad with intermediate and high.

Driving the car up a slight grade, stopping car and trying to reverse the motion is harder to do than ever. The clutch pedal has the proper foot board clearance.

The above car does not work this way all of the time. The owner drove it a distance of 140 miles a few days ago since the above clutch job was done on it and everything worked fine. The trouble seems to me to be in the clutch some place but we have been unable to find it. K. J. Foulke, East of 10th St. Park, Richmond, Ind.

ON your 1934 Dodge, the first thing I would check would be the

automatic clutch throw-out mechanism if the car has that equipment on it. If it has, I would disconnect it and use the clutch in the conventional manner.

However, I am inclined to believe that your trouble may be caused by the throw-out retractor spring not having been replaced or because the new clutch which you installed is warped. A lot of the difficulties which I have run across the last year or so have been the result of new disks which were warped and have resulted in the trouble such as you describe. Another point to check is the thickness of the facings. If the facings on the disks are too thick, it will also cause your trouble.

If none of these suggestions clear up your trouble, I would recommend that you check the clutch shaft to make sure that the splines are in good condition and that the shaft is not sprung, and also that the clutch hub moves freely on the splines. Another point to check is the clutch pilot bushing. If you have not replaced it, I would suggest that you do, for a defective pilot would cause the trouble you are experiencing.

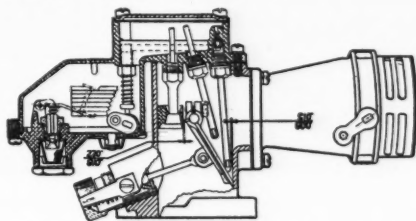
WORN AIR VALVE

In regards to a Marvel carburetor on a Buick, Model 57, 1934, I overhauled same, replaced float, needle and seat, air spring, put on all new gaskets. Float has proper height, standard setting, proper stand pipe clearance from wall, proper tail clearance. The trouble is a loading condition at idle speed. When motor is raced up for a few seconds and then brought back to idle speed, it will idle all right for a very short time and then start idling rough. Motor is in



"I'm not that good, buddy, you'd better write to Motor Age Clearing House!"

good condition. Heat riser is O.K. Grand Auto Electric Service, 1520 Blvd., Jersey City, N. J.



THE trouble with the Marvel carburetor on your 1934 Buick, Model 57, is caused by a worn air valve. I would suggest that you replace the air valve and also the air valve shaft, and if you do this I am quite sure that your rough idling condition will be overcome.

OIL BURNER

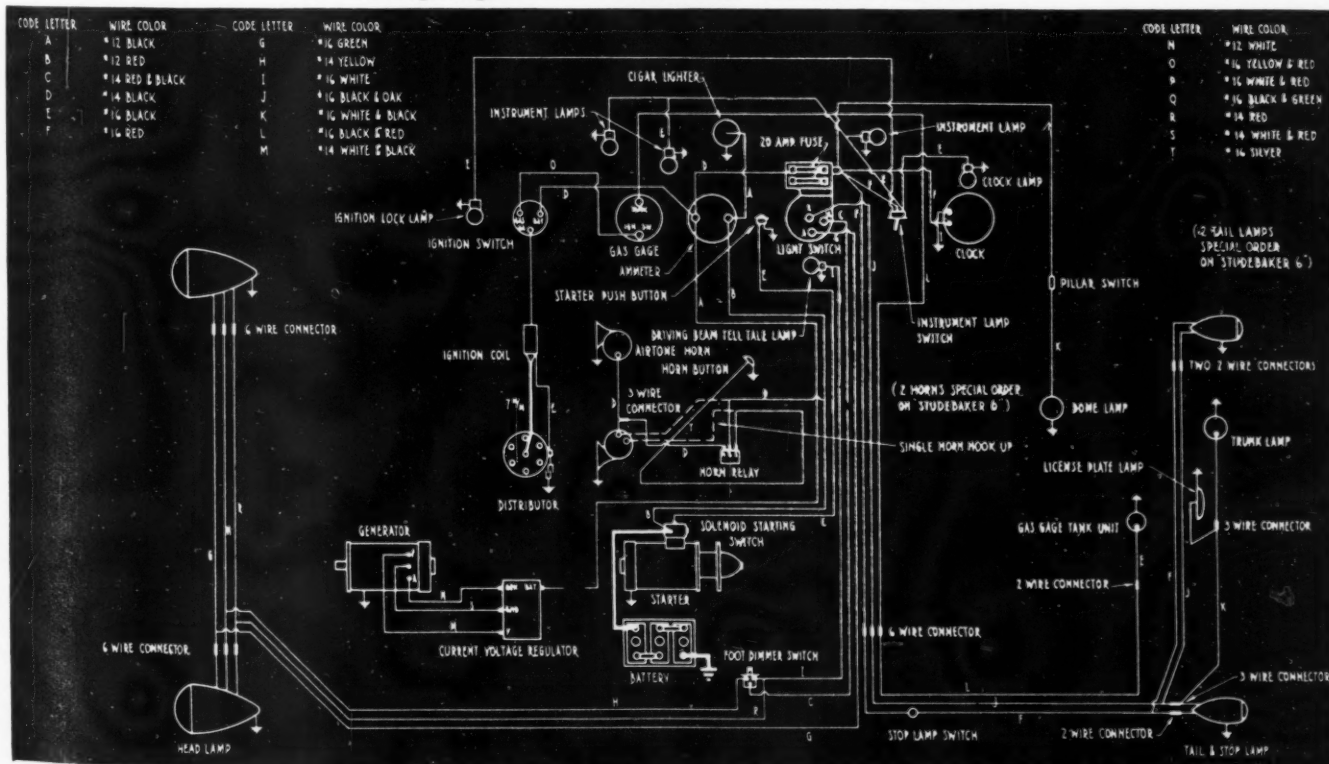
We overhauled a 1932 Studebaker Dictator eight-bored cylinders .020 in. oversize, put in new pistons, fitted close tolerances, put in new rings, one oil control and two compression, leaving the top ring off as recommended. Rebabbitted rods and gave them about .001 in. oil clearance as the journals were about 1½ in. flat. Put in new intake valve guider. Everything seemed to be O.K. but the customer says it uses about the same amount of oil as before overhauling. It is a quart to every 150 miles.

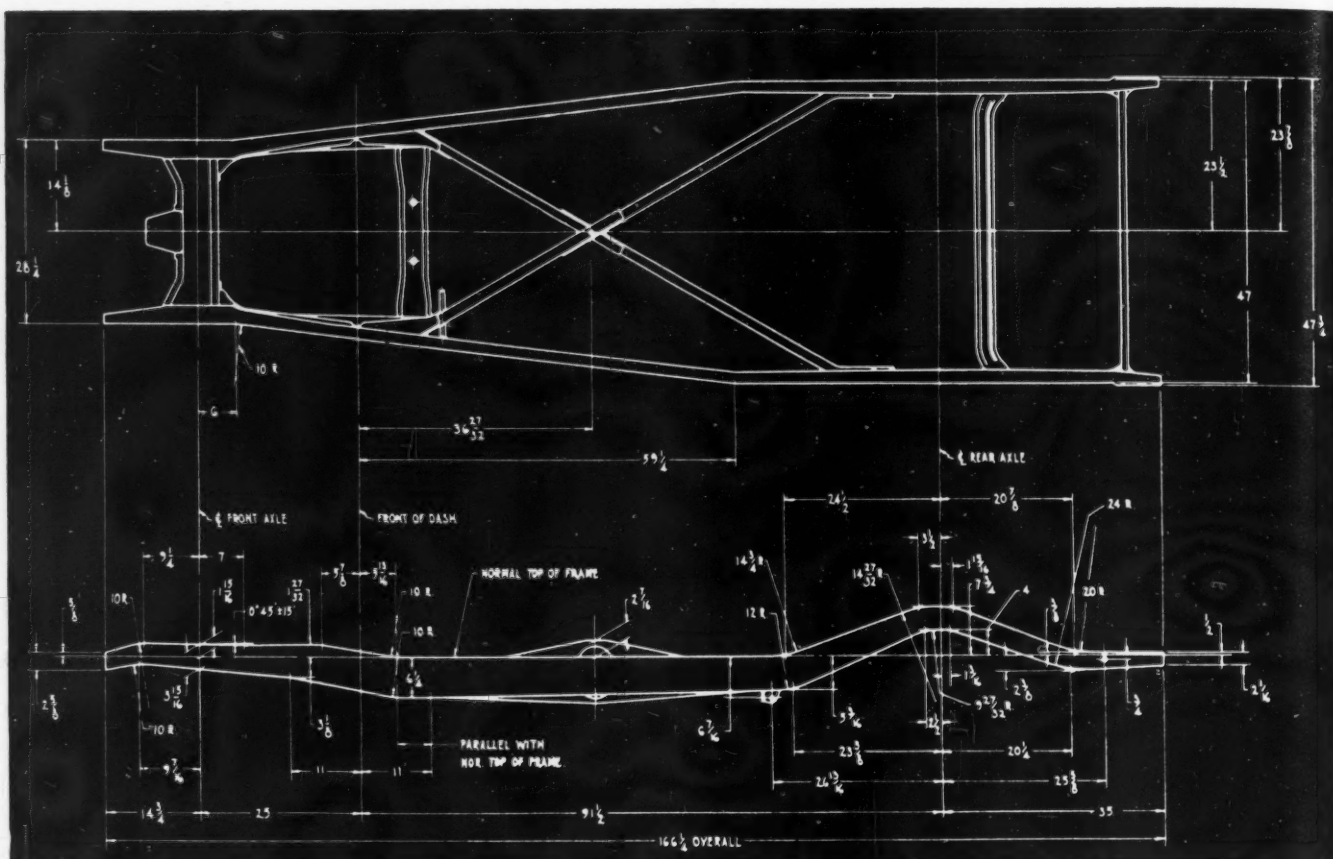
The customer says the gas mileage is not quite as good but I told him it would get better when motor limbered up. It has gone about 4,500 miles since overhauling. H. C. Gibson, Gibson Garage, P. O. Box 450, Bryan, Texas.

ON your 1932 Studebaker Dictator Eight which continues to use an excessive amount of oil after the cylinders were rebored, there are several things which might be causing your difficulty. First of all, the crankshaft journals may be so much out-of-round that regardless of the fact that you installed new rods there is so much throw-off from the bearings that the rings cannot hold it down. To check on this you can make an oil test on the bearings and to assist you in this I am sending you a reprint of an article which gives complete instructions on making this test.

There is also the possibility that when the cylinders were rebored that the surface was not smooth enough so that the rings were worn out prematurely because of the rough surface. It is also quite possible that the

Wiring Diagram—1938 Studebaker Commander and Six





Chassis Frame Dimensions—1938 Studebaker Commander and Six

cylinders were not cleaned out thoroughly after the rebore job, with the result that excessive wear would take place as soon as the new pistons were installed.

I would also suggest that you check the fuel pump and if this is of the combined pump and vacuum type, I would advise a complete overhaul for if the diaphragm is punctured it will draw oil directly from the crankcase into the intake manifold.

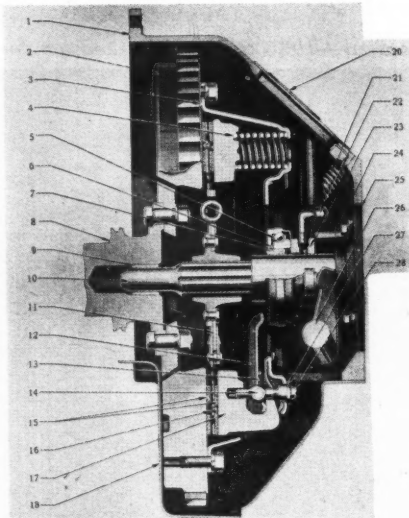
Of course, all this is assuming that you do not have any oil leaks from the oil pan. It probably would be advisable to tie a piece of heavy cloth underneath the engine and then take it out for a good run at slow speeds and fast speeds to see if there is any oil dripping into the cloth tied underneath the engine. I would advise that you make this check before you do any work on the car. If it does leak, you will have to install new gaskets and check up on your main bearing.

CLUTCH GRABBER

I have been having considerable trouble in trying to correct a grabbing clutch on a 1933 model DeSoto. I have checked the universals, rubber engine mountings and have had the clutch out so many times I have worn out the bolts. Any help will be appreciated. K. J. Gribble, 661 W. Garvey Blvd., Monterey Park, Calif.

IF you have not already done so, I would suggest that you take the clutch down once more and have the

fingers adjusted on a clutch rebuilding unit so as to be absolutely sure that they are 100 per cent correct. In addition, if the facing is oil soaked, as the result of a leaking main bearing, I would suggest that you fix the



main bearing and also replace the clutch plate.

In addition, I would make sure that the clutch shaft is not bent or sprung and that the splines are in good condition.

HYDRAULIC BRAKE TROUBLE

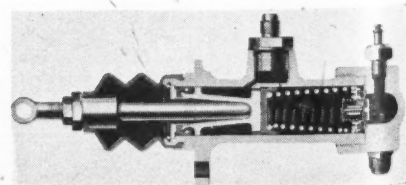
I wish to know if you can explain the cause of the filling up and locking of hydraulic brakes on some cars,

especially some of the older Plymouths. The brakes will fill up and stall the car and can be released by bleeding a small amount of fluid from any wheel and are all right for awhile but will do the same thing again after a time. M. Whalen, Knox Garage, Knox, North Dakota.

IFEEL sure you will find this condition to be due to the fact that the compression piston in the master cylinder is not returning completely to the off position. This action prevents the return port in the master cylinder from being uncovered and thereby does not permit the fluid in the lines to return to the reservoir.

This condition may be due to the fact that the return port is clogged but is more likely to be caused by the fact that the rubber cup on the piston has become swollen and is now actually too large. This condition could be brought about through the use of inferior brake fluid or the use of a fluid that is not really intended for hydraulic brakes.

The correction, of course, is to overhaul the master cylinder and replace all of the rubber cups and be sure that all of the ports between the reser-



voir and the master cylinder are free. I feel quite sure that this will overcome your difficulty.

A QUICK CHECK FOR CARTER CARBURETOR TROUBLE

From Carter Carburetor Corp.—Sales & Service Summary

Float Level

Look in the air horn with the motor running at idle speed. If there is any sign of wetness at the tip of the nozzle or diffuser, the float level is too high. The float level is very important and should be reset exactly to the manufacturer's specifications.

Low Speed

Turn in the idle adjusting screw until the motor speed slows up. Unscrew the idle adjusting screw until the motor rolls. If it will not do both, then low speed circuit is out of adjustment.

After adjusting the carburetor for dead idle, you should be able to open throttle to any speed up to approximately 25 m.p.h. and motor should run smoothly. If it does not, check idle system.

High Speed

With the motor turning at a rate equivalent to about 25 m.p.h., move your hand very slowly over the top of the air horn. The motor should speed up slightly as the hand covers a part of the air horn. If it does not, install a two-step lean metering rod or a two-step lean metering jet and try again. Then, if the motor does not speed up when a part of the air horn is covered, the high speed system is out of order. Don't leave the two-step lean rod in. Burned valves may be caused by it.

Pump Circuit

With the motor stopped turn the throttle to wide open position quickly. A clear stream from the pump jet, continuing after the throttle is wide open, indicates that the pump system is all right, otherwise repair it.

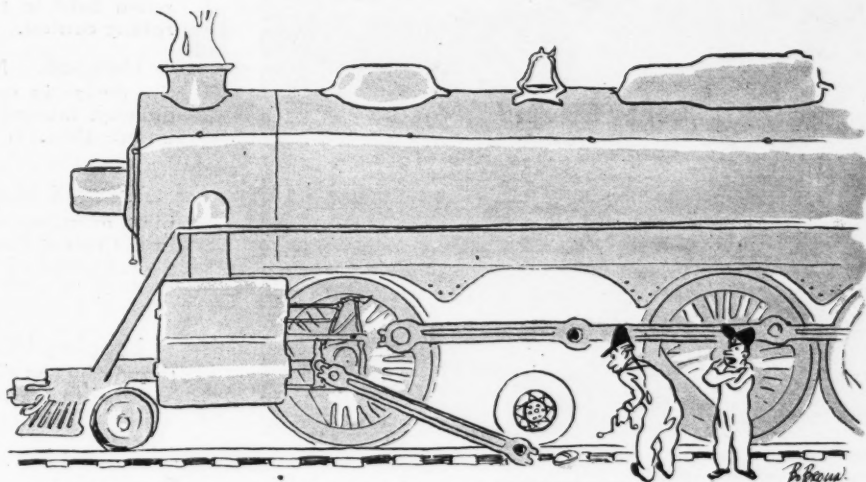
Hand Choke

Hand Choke: Be sure that the choke valve is wide open when the choke button is all the way in, and that the choke is fully closed when the button is pulled out.

Climatic Control: See if the choke valve will open of its own weight with the motor hot. If not, find the obstruction and remove it. Always clean the strainer screen of the Climatic Control.

The above checks do not require special tools or test equipment.

These tests are given to you so when a customer drives into your place of business and says his carburetor is out of order, you can very quickly determine whether that is the



"I told you Motor Age Clearing House was just for automobile questions!"

case, and if not, you can then search for other possible causes of his trouble; show him what is wrong, and fix it. This will build customer goodwill for you and save much time now lost in repairing units on which the customer blames his trouble but which may not be the real cause.

Of course, the service man should not overlook the opportunity of selling the customer a complete motor tune-up which is necessary to restore the car to its original standard operating condition if the car has been operated over 10,000 miles. This includes taking the carburetor apart and replacing all gaskets and worn parts, cleaning out the air passages, and rebuilding the carburetor to standard condition.

The perfect carburetor can only deliver to the motor the correct mixtures of gasoline and air as required by that motor. The many other factors affecting both economy and performance cannot be changed in any way by the carburetor. Economy results only from the perfect functioning of all the various parts which affect the efficiency of the motor such as compression or ignition. Heavy grease, improper oil, under-inflated tires, dragging brakes and wheel bearings should not be overlooked.

WE'RE LISTENING

I was much interested in what J. W. Mundell of Whittington, Ill., had to say about having all the copies of the MOTOR AGE from 1915 to 1929.

I wonder if it would be possible for MOTOR AGE to publish a special number of the MOTOR AGE reprinting the announcements of the new cars and illustrating the cars covered in the years 1908 to 1938, the thirty years most important in the motor car industry. I would like to have one of the kind in book form similar to the Chilton Automobile Directory. I would gladly pay an extra price for such a book or number of the MOTOR AGE and no doubt the majority of MOTOR AGE readers that have been interested in the motor car for sev-

eral years would like to be able to obtain something of the kind for a keep-sake.

I would like very much if you have space in your fine magazine to publish this letter to see what reaction the MOTOR AGE readers show toward my idea.—A Reader of MOTOR AGE.

FLAT RATE QUERY

I would like to know why you don't list grease retainer operation in Flat Rate Manual as it takes too long to arrive at price now. J. May, Adeline Garage, 1225 Seventh St., Oakland, Calif.

THERE should be no difficulty in this, as all that is necessary to do is to add the prices for Operation B1 and W1. That will give you the price for renewing the grease retainers on the one side and if the grease retainers are to be replaced on both rear wheels, the price would then be multiplied by two.

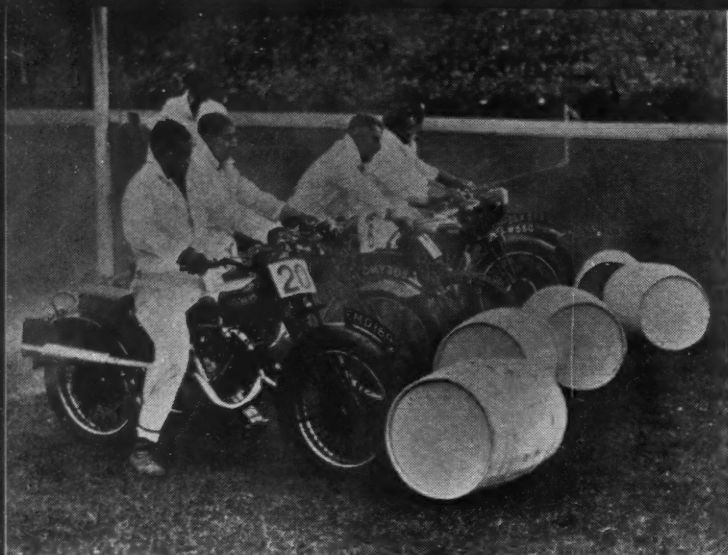
WON'T IDLE

I have a 1936 Studebaker on which I have checked all the ignition, cleaned the carburetor on a tune-up job. Now the trouble is that I can not get the motor to idle under 20 miles per hour. This did not occur before I cleaned the carburetor, etc. Can you help me? Geo. J. Johnson, Modern Auto Service, 316 Center, Muskegon (North), Mich.

FROM your description I am inclined to believe that your trouble is due to an air leak in the carburetor. It is my belief that when you cleaned this it was not bolted up to the manifold tight or, if you removed any of the jets, that they were not replaced securely.

I would also suggest that you check the float level which should be 15/32 in. below top of float chamber.

There is also a possibility that the economizer on this carburetor is leaking. I am quite sure that if you go over the carburetor thoroughly as I have outlined, you will be able to locate and overcome your trouble.



(Read around to left)

Goofy Game. One of the attractions at a motorcycle rodeo held in the Crystal Palace, London, was this barrel rolling contest. Barrels of fun for onlookers and contestants

Hanged. Novel display arranged by a Buffalo, N. Y., tire dealer in order to encourage the use of safe tires. A dummy, labeled "Public Enemy No. 1," and representing unsafe tires, is shown hanging from a noose after being condemned

Winged Midget. Tony Le Vier, 25 year old racing pilot, examines the engine of the tiny speed plane he entered in the recent Pacific International Races at Oakland. It has a wingspread of only 18 feet and weighs but 1,500 lb. Powered by a 500 h.p. engine, it is said to be capable of 350 m.p.h.

Looping Midget. Here is Fred Post doing a loop in his thunderbug at the Atlantic Stadium, Los Angeles. It doesn't seem to faze Barney Ray in the following car as he pushes calmly by



Eyston Sets July 18 for Record Attempt Fellow-Countryman, Cobb, to Make His Bid Late in August

The world land speed record of 311.42 miles per hour may be shoved up another 10 miles per hour on July 18 by Captain George Eyston, the British king of super-speed.

Eyston announced from London that he planned to make his official bid on that day for a record higher than his current mark established at Bonneville Saltbed last November.

Bound for Bonneville, he plans to leave London on June 29, sailing on the S.S. Queen Mary. He has advised the American Automobile Association's Contest Board that he plans to make test runs over the 13-mile salt flat course for two weeks and then make his full-throttle attempt.

Simultaneous with announcement of the Eyston schedule came word from John Cobb, fellow Britisher, that he will race his new turtle-shaped speedster in an official attempt at the record on August 21. Cobb plans to sail from London on the S.S. Georgic on July 8. After a series of test runs to iron out the "bugs" in the new Napier-Railton motor he will race over the Bonneville course in Utah in his first attempt at super-speed laurels.

The third serious contender for the title, America's Ab Jenkins, had not yet applied for his AAA sanction for an assault at the record as MOTOR AGE went to press.

Whether he would complete his new record car in time for this season's campaign was being conjectured in racing circles. However, it was said that work was going forward behind closed doors on his new car at Indianapolis. It was anticipated that Jenkins, a veteran of weather conditions and "ripe" racing days at Bonneville, would make application for an early September date.

If Jenkins' plans materialize he will become the first American to seek the record since Lee Bible met death in a futile attempt with J. M. White's Triplex on Daytona Beach in 1929, a year after Ray Keech established a short-lived record in the same car.

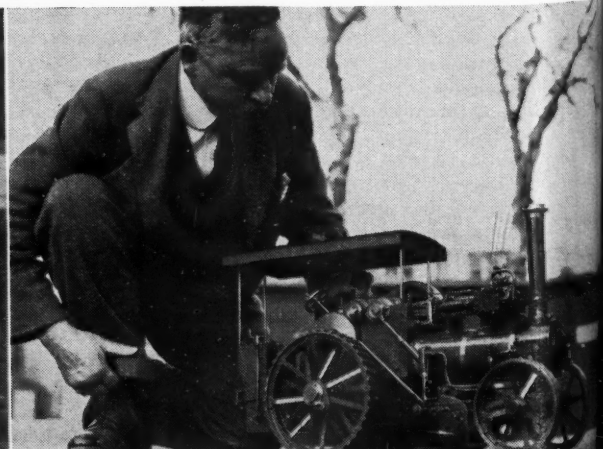
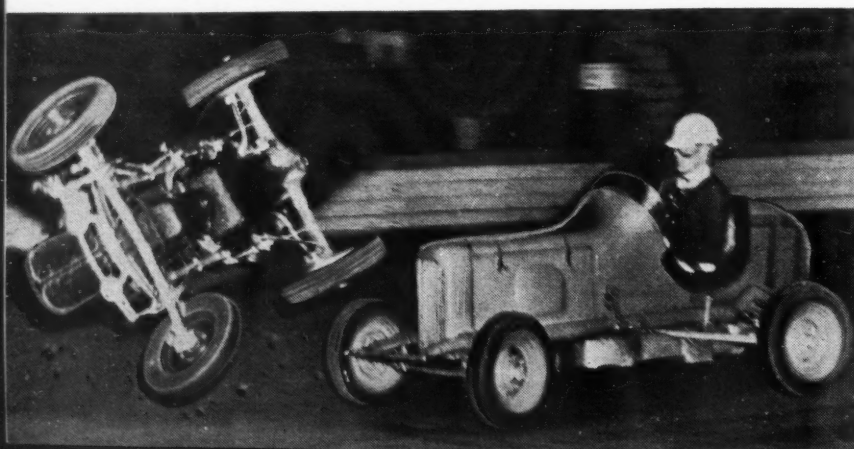
Hope Wanes for Roosevelt Opening

Speeding race motors will not echo around the tricky turns of the Roosevelt Raceway on Long Island before the 1939 season opens, MOTOR AGE learned in a survey conducted since the George Vanderbilt Cup classic was cancelled from the major schedule.

Hopes for a 250-mile race there this summer have waned in recent weeks, and only last week the Amer-

(Continued on page 63)

Big Little Job. It took G. Wade, of Worthing, England, two years to make this remarkably fine model of a steam driven traction engine. It actually works and is capable of hauling heavy loads.



(Read around to right)

Tiny.—That's the name of this big policeman calling motorists to the Lars Super Service Station at Queens Village, Long Island, N. Y. Abraham Ross, owner of the station, had the figure made of cement and placed at the entrance of his station last March. Ross claims it has been an extremely profitable bit of advertising, directly responsible for an increase in business of over 100 per cent and necessitating the addition of four men to his staff. The figure stands 18 feet high

Largest. Mr. C. Slusser, vice-president of Goodrich Tire & Rubber Co., looks at the recently completed heavy duty truck tire, largest of the industry. Size—24.00 by 32, weight—1200 lb.

New Wrinkle. Practicing a technique of their own for refueling are Kenneth Kress and Glenn Englehart, Lock Haven, Pa., fliers as they prepared for a round-trip non-stop flight from New York to Miami. Their method consists of picking up five-gallon cans of fuel from automobiles that keep pace with the plane at certain points along the route

Flagged. Ted Horn, driving a Miller Special, as he was flagged by "Doc" Werner when he flashed across the finish line to win the 20-mile Inaugural Race at Reading, Pa., opening race of the 1938 AAA schedule

Car Appearance Reconditioning Institute

Manufacturers' Activity for Used Car Education and Research

Realizing that thorough, but fast and inexpensive, methods of used car reconditioning are necessary before car dealers generally can afford to adopt a practice which competition is rapidly making necessary in used car merchandising a group of twelve manufacturers has launched an activity in Detroit which already has created widespread interest.

Calling their venture the Used Car Appearance Reconditioning Institute these manufacturers are operating a completely equipped shop designed to fill two purposes: 1. Education of dealers and their service men in tested methods of time-saving and economical appearance reconditioning; 2. Constant research with new tools, equipment, and materials to improve further the methods already in use.

Visitors to the institute are given a two-hour demonstration which highlights all of the operations through which a dull and battered used car can be put to emerge as a completely reconditioned vehicle second only to a new car in appearance. Featured in this demonstration is an analysis of the 35 operations that have been developed for a complete appearance reconditioning job.

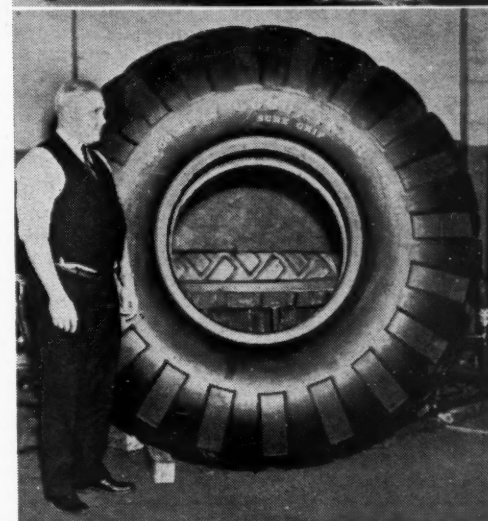
Another feature is a display of time-saving props, developed in the Institute's own shop, and easily made

by any mechanic out of various lengths of pipe, elbows, fittings and casters. These props expedite disassembly and handling of various parts during the reconditioning process, and when used in accordance with Institute methods play an important part in speeding up work to save time and cut down labor costs.

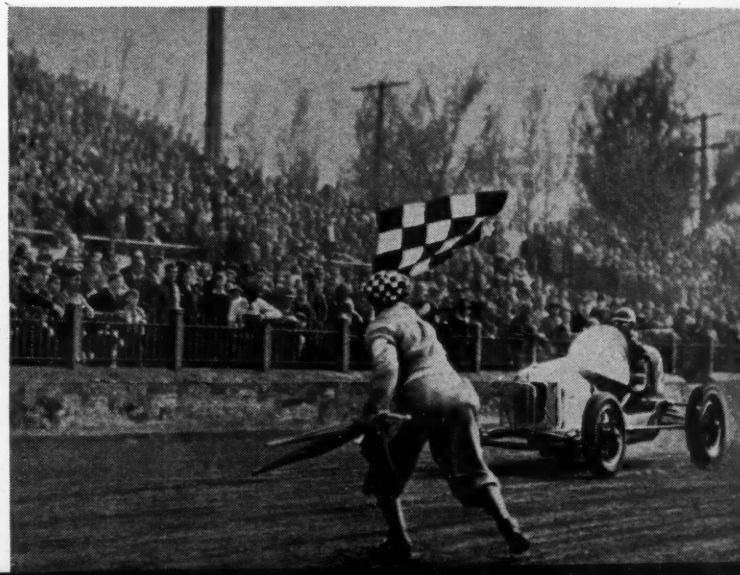
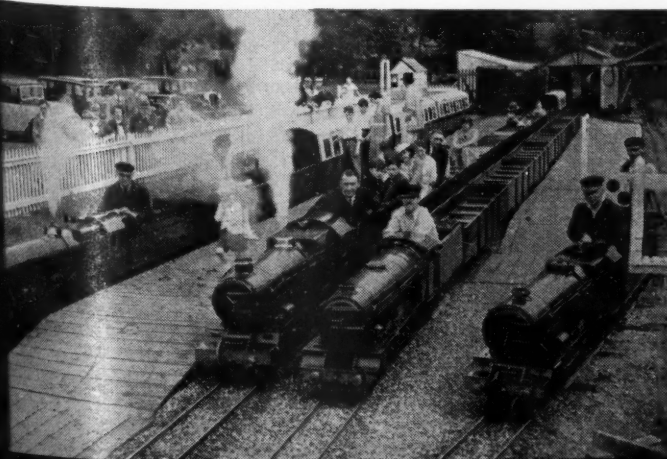
In the Institute's shop a crew of skilled workmen under the direction of F. Y. Wheeler is constantly at work on actual appearance reconditioning operations using tools, equipment, and materials developed by the sponsoring manufacturers, but also trying out and testing any new product which shows promise of cutting time or labor costs even further. In this shop each car is put through the 35-point program and here, too, dealer's service men may come for practical instruction in actual use of tools and equipment and training in appearance reconditioning routine. The only expense involved is transportation to Detroit and the time required to observe the methods advocated.

Cars reconditioned according to the Institute's recommended procedure can be handled at an expense which represents a small part of the increase in resale value aside from

(Continued on page 65)



Half-Pint. Probably the finest miniature railway in England is that at Farnborough, Hants. The engines are models of the country's crack express locomotives. They are shown here in the Farnborough terminal





Caravan of the General Motors Parade of Progress was the largest single entry in the preview motorcade of the New York World's Fair. Here's the huge trucks and an early "horseless carriage" proceeding in the parade.

Making Tungsten for Breaker Points

An interesting demonstration of the processes in the manufacture of the tungsten metal used on breaker points, etc., was recently given at the "open house" celebration of the opening of The Cleveland Tungsten Mfg. Co.'s new plant at 10200 Meech Ave., Cleveland, Ohio—stated to be the only plant in the United States devoted exclusively to the manufacture of tungsten, its alloys and products.

Tungsten, which remains hard at red heat, and which has a melting point of 6150 degrees Fahrenheit, about three times that of steel, naturally offers many interesting fabricating problems, especially as it must be produced from the ore in the form of a powder. Mr. E. O. Oberdick, president of the company, explained that the plant was now equipped for the manufacture of tungsten metal both by the hydrogen and by the carbon reduction process. The former is used in cases where the highest purity tungsten is necessary, such as is required in automotive ignition points, the electrodes used in atomic hydrogen arc welding and spot welding, in X-ray tube "targets," etc. Though not quite equal in purity to the hydrogen-reduced metal, the tungsten

produced by the carbon process is suitable for hard-surfacing of steels, hard tungsten cutting tools, and similar purposes.

After compressing the powder into molds in powerful presses, it is "worked" at high temperature, slightly below actual fusion, into rods and wire which surpass even the best alloy steels in tensile strength. From these rods come the small circular discs which are now generally used on breaker points and other locations on the automobile or truck where the intense heat of the "make-and-break" action of the current must be withstood.

NADA Study of Selected Dealer Group

Results obtained from a survey which sought comparative data on the operations of a selected group of automobile dealers for the calendar years 1937-1936 are reported in a bulletin recently issued by the National Automobile Dealers Association. As pointed out by the association, the figures contained in the report represent dealers whose operations are considerably above the general average. The reporting dealers averaged \$420,640 total sales volume in 1937.

An analysis of the data contained

Spin-Ur-Wheel

Matched Sets

Matched unit sets of Spin-Ur-Wheel and the new larger Acorn design gear shift lever ball are now available with bronze medallion inserts of the Masonic, Knights of Columbus and St. Christopher. The Sinko Tool and Mfg. Co., 351 N. Crawford Ave., Chicago, in announcing these accessories, states that they are available in red, onyx, green, gray, beige and brown



colors and can be purchased individually or in matched sets. The No. 49M de luxe ball is priced at 75 cents and the No. 149 spinner is priced at \$1.25. The new rim-mounted Spin-Ur-Wheel will fit all types of steering wheels and presents no unsightly band to deface the outer rim. No obstruction prevents the easy return of the steering wheel to the normal position. Simplified mounting and no dismantling necessary.



"I won't need a new radiator . . . we had this spare one at home!"

in the report is set forth by the association as follows: 1. New car inventories doubled; 2. Used car inventories declined; 3. Gross margin increased by 4.35 per cent; 4. Total expense increased by 7.60 per cent; 5. New car dollar sales volume declined; 6. Used car dollar sales volume increased; 7. Used car gross loss declined; 8. Reporting dealers did 17.79 per cent of their gross sales in other departments, compared to 15.78 per cent in 1936; 9. On the sales in other departments they made a gross margin of 36.55 per cent compared to 23.42 per cent on new cars and a gross loss of 6.85 per cent on used cars; 10. Reporting dealers had an operating loss of \$6.59 per new car sold, in their new and used car departments, after crediting \$8.02 from finance reserve earned.

The association concludes. "The business of selling automobiles at retail cannot be divorced from the service and parts departments if the dealer expects to make a net profit. The one enhances the value of the other. The combined new and used motor vehicles selling alone is not generally profitable. This is, of course, due to the used car operation which consumed 52.71 per cent of new car gross. A dealer sells new and used cars to owners who become customers of the service and parts departments, and in turn the latter become prospects for new and used cars. Consequently, a balanced operation is essential."

Automotive Service

A new and enlarged two-volume edition of *Automotive Service*, written by Ray F. Kuns, principal of the Cincinnati Automotive Trade School, has been published.

The two volumes cover all phases of repair and maintenance service, treating with automotive theory in the first part of each chapter and actual service in the second.

The volumes consist of four units each, Volume I containing units on:

1. The Service Station.
2. Frames, Wheel Suspension, Steering and Ride Control.
3. Transmissions, Clutches, Universals, and Front-Wheel Drive.
4. Rear Systems and Brakes.

Volume II contains units on:

1. Power Plants, Oiling and Cooling Systems.
2. Engine Repair and Maintenance.
3. Fuel and Ignition Systems.
4. Automotive Electricity.

The book is published by the Bruce Publishing Co. with offices in New York, Milwaukee and Chicago. Price is \$3.50 for Volume I, \$3.75 for Volume II. Combination price, both volumes, \$6.75.

Bantam Distributors

Appointed

A. C. Olander, Sales Manager of the American Bantam Car Company, Butler, Pa., has announced the appointment of two new Middlewestern distributors. P. W. White Motor Company of St. Louis has been given Eastern Missouri, Southwestern Illinois; and W. M. Duvall Motors of Tulsa, will cover Northeastern Oklahoma.

Bantam has not previously been represented in these districts, Mr. Olander said.

Midget Championship to Carry \$3000 Purse

Awards to Be Made to Winners at Season's Close

Under arrangements completed by the A.A.A. Contest Board officials, all promoters operating in the Eastern A.A.A. Midget Racing Circuit are co-operating in a plan to provide a "silver lining" for the midget championship crown. In addition to the customary cups and trophies which accompany championships won in A.A.A. sanctioned competition, the 1938 season will see a purse of approximately \$3000 divided between the leading drivers and the owners of the leading cars.

The A.A.A. plan calls for an assessment of \$10 on each race, over and above the stipulated prize money, which will be held in trust until the end of the season, when it will be awarded to the six leading drivers and the owners of the five leading cars. As the schedule stands a total of nearly 300 races will be run before the season closes on or about October 1st. Of this amount half will be set aside for the drivers and half for the car owners. First position in each division will pay a minimum of \$500; second position \$300; third \$250; fourth \$200; fifth \$150 and sixth \$100.

The allotment of points controlling these awards is to be officially an-



Space is at a premium around many London homes, so quite a few English car owners use the type garage shown above. The motorist drives his car onto the platform, steps inside his doorway, presses a button and the car sinks out of sight completely protected from theft and adverse weather, with only an oblong mark on the lawn to show where the car has disappeared.

Frank M. Speaker Now With AP Parts Corporation

The appointment of Frank M. Speaker as Sales Supervisor, is announced by W. E. Bullock, vice-president of the AP Parts Corporation, Toledo, Ohio.

For the past sixteen years, Mr. Speaker has been connected with the parts replacement industry, having represented in special sales capacities one of the large piston ring manufacturers. His wide acquaintanceship with parts replacement jobbers and dealers throughout the entire country, qualifies him in his new capacity. His work will bring him in contact with AP Muffler territory representatives and distributors, to assist them in perfecting AP's new merchandising plan.

Mr. Speaker's headquarters will be at the Toledo Offices of the company.

Yerger Leaves Gomery-Schwartz

After 29 years' service with Gomery-Schwartz, Hudson distributors in the Philadelphia area, Frank H. Yerger, technical manager, has resigned.



Frank Yerger

Mr. Yerger, one of the pioneers in the automotive industry, started his automotive career with the General Electric Vehicle Co. in 1899. He also took part in the Glidden tour and drove in the Fairmount Park races as well as on the old Point Breeze track in Philadelphia.

The first car, a Pope Toledo, to be driven through the South was piloted by Mr. Yerger.

Mr. Yerger has not made any particular plans for the future, but says he first will take an extended vacation.

McAleer Appoints Neubauer

The McAleer Manufacturing Co., Detroit, has announced the appointment of A. G. Neubauer as sales manager. Mr. Neubauer has been with McAleer for a number of years.



"Ed's a good man, but he has to keep reminding himself!"

April Car Shipments

April factory shipments of passenger cars and trucks are estimated at 237,400 units in the preliminary estimate released by the Automobile Manufacturers Association. This is slightly under March shipments and 57 per cent under the corresponding month of last year.

On the basis of this estimate, shipments for the first four months are placed at 906,769 units, a decrease of 51 per cent under the same period last year.

The Association's report is summarized below

April, 1938	237,400
March, 1938	238,753
April, 1937	553,321
4 months, 1938	906,769
4 months, 1937	1,855,339

Ford Introduces Two C.O.E. Type Trucks

Entry of Ford Motor Co. into the cab-over-engine type of heavy-duty truck field is signalized by the introduction of two cab-over-engine models — a short-coupled 101-in. wheelbase completely new job, and a 134-in. wheelbase model essentially the same as the standard 134-in. Ford truck with cab forward except for major front end differences.

Feature of both new models is complete interchangeability of parts with the regular Ford truck models, as all major parts such as rear axle, powerplant, wheels, rear springs, etc., remain the same.

The truck type, 85-hp. V-8 engine, with aluminum pistons and cast iron head is used exclusively on both models and has the same replacement advantages.

Due to increased loading of the front axle, both models are equipped with a new heavy duty front axle sprung on two semi-elliptical springs. It was found desirable to change spring suspension to provide good riding quality for a cab-over-engine model. Steering geometry also has been altered due to the relocation of the front axle which places the pitman arm forward of the axle.

A new all-steel full welded construction cab has been designed for the new models. Height and width of cab have been so arranged as to produce a normal seating position.



Lothair Teetor

... has been appointed president of the Perfect Circle Co., Hagerstown, Ind., succeeding his father, C. N. Teetor, who was president and general manager until his death last year. Lothair Teetor has been actively connected with the Perfect Circle Co. and its predecessors for 18 years. Other officers elected are: Ralph R. Teetor, vice-president, head of the engineering division; L. B. Davis, secretary-treasurer, and C. Ray Teetor, controller.

Ford-Opel May Clash for Control of British Market

A news report from London, May 10, indicated that London trade circles foresee a finish fight for control of the British automobile market between Ford Motor Co., Ltd., and Opel Co., German subsidiary of General Motors Corp.

Aroused at what he termed 'dumping of German subsidized cars' on the domestic market, Lord Percival Perry, chairman of Ford Motors, was reported as warning the stockholders of the company at the annual meeting that influx of German cars must stop.

Catalogs, Manuals, Books, Merchandising Aids

Globe-Union, Inc., 900 East Keefe Ave., Milwaukee, Wis., has issued a new catalog describing their merchandising program and containing selling helps and battery service procedure.

A new 48-page catalog has just been issued by The Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago, Ill., makers of THOR electric tools. It contains four major sections and gives complete descriptions, specifications and prices of the entire THOR line.

The B. F. Goodrich Co., in conjunction with the Chexall Division of The Chex-Chart Corp., has issued a new 400-page automobile tire, battery and accessory merchandising and reference manual. Copies are available to Goodrich dealers with certain accessory purchases.

The 1938 edition of the Chexall accessory Blue Book is just off the press. It contains complete accessory specifications on all the 1938 cars. Price \$4.00. Published by The Chex-Chart Corp., 624 South Michigan Ave., Chicago, Ill.

Bulletin No. 962 issued by Norma-Hoffmann Bearings Corp., Stamford, Conn., covers their line of precision needle roller bearings.

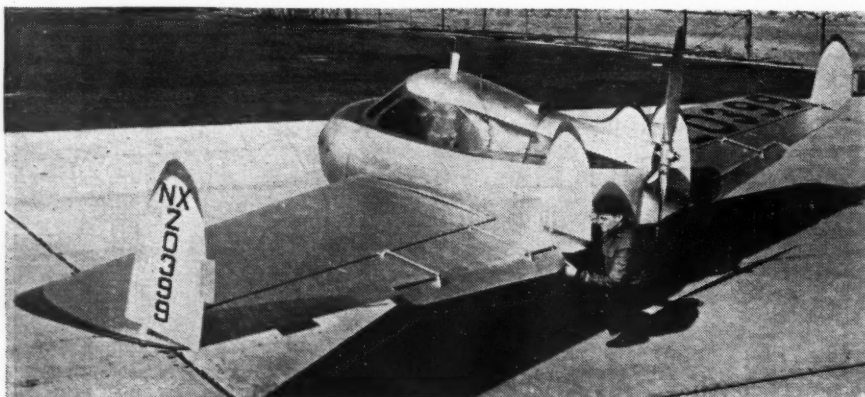
Bear Mfg. Co., Rock Island, Ill., has a new 48-page booklet with over 38 diagrams and 82 photographs featuring all phases of wheel alignment and safety test work. Write for your copy of "What Every Service Man Should Know."

A new book of 174 pages has been issued by Link-Belt Co., 307 North Michigan Ave., Chicago, Ill., on its line of Silverlink roller chain and sprockets for drives and conveyor use. Copy will be sent to anyone having use for this type of material.

A handy folder giving a complete listing of Armstrong-Victor headlamp cork strip sizes has just been made available to the trade by the Victor Mfg. & Gasket Co., P. O. Box 1333, Chicago, Ill. Copies will be sent free upon request.

Containing full details and pertinent information in an easy-to-read and easy-to-understand manner, a new catalog by the K-D Lamp Co., Cincinnati, Ohio, on the subject of safety lighting equipment has been made available to anyone who wishes a copy. It contains important data, including a series of charts on I.C.C. approvals, tests, etc.

Supplementing the complete kit of sales helps available to dealers handling Ward auto aerals, the Ward Products Corp., Cleveland, Ohio, has just introduced a new wall hanger display unit. Attractively lithographed in orange and blue, the new wall boards can be "spotted" around the service department or showroom, and can be used to display any of 11 different models of Ward aerals. A set of price stickers is furnished with



No tail has this new type plane seen in New York. Resembling a metal bumblebee, the plane is a pusher type, 95-hp. engine. Top speed is estimated at 120 m.p.h.

each board. The units are free to Ward dealers.

Two new small Atlas backgeared screw-cutting lathes, swinging diameters up to 6 in., are the subject of Catalog 29 released recently by Atlas Press Company, Kalamazoo, Mich. All phases of the modern compact design are completely described—Timken spindle bearings, wide speed range, precision-ground bed, V-belt drive. Copies are available from Department 7 address above.

The SERVICE MAN'S GUIDE to Automotive Lubrication has now gone into its fifth edition, a total printing of well over twenty-five thousand.

Improvements have been made in the new edition. All text matter has been revised to include new automotive constructions, as well as retaining all the fundamental text matter on standard cars, units and parts, and latest progress in the art of oil refining and grease making.

The new edition contains 120 pages with 119 illustrations and includes the very latest oil and grease lubricant specifications as approved by the Society of Automotive Engineers.

SERVICE MAN'S GUIDE to Automotive Lubrication is written by J. Howard Pile, Editorial Director of CHEK-CHART, 624 S. Michigan Ave., Chicago. The price is \$2.00 for single copies.

Three folders have been released by the Alexander Automotive Engineering Co., 345 W. Manchester Blvd., Inglewood, Calif., covering their "Aristocrat" line of racing heads for model A and B Fords, the "Aristocrat" for Willys 77, and the Alexander aluminum alloy manifolds.

A manual of service station merchandising and management ideas has been published by the National Association of Petroleum Retailers, 342 North Water St., Milwaukee, Wis. The manual contains 240 pages, over 100 illustrations and thousands of ideas. The make-up of the book is simplified and direct with very little theory expressed. Price is \$2.50 for single copies.

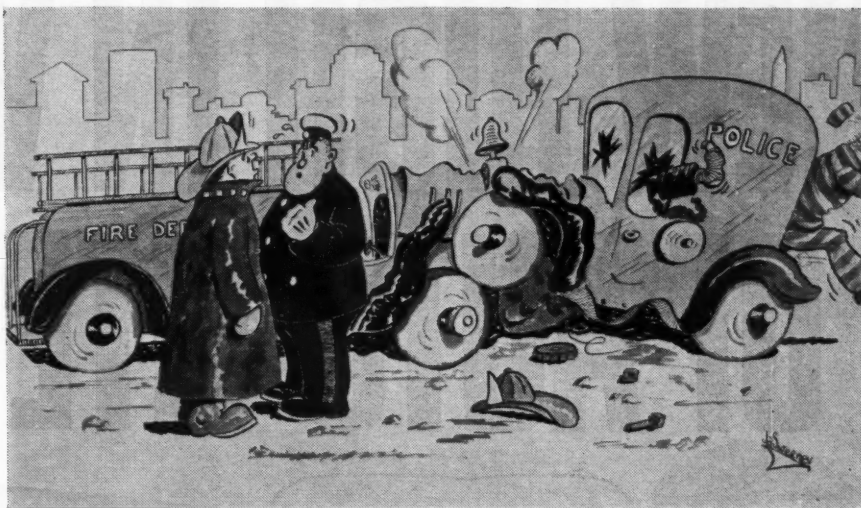
A.S.I. Show Scheduled For December

The 1938 Automotive Service Industries Show will be held Dec. 5 to 10, inclusive, at the Navy Pier in Chicago. Decision to this effect was reached by the joint operating committee representing Motor and Equipment Manufacturers' Association, the National Standard Parts Association and the Motor and Equipment Wholesalers' Association.

Members of the joint committee representing the respective sponsoring associations for this year's show are:

C. C. Bradford, Eaton Products, Inc.
C. P. Brewster, K-D Manufacturing Co.
B. G. Close, King Quality Products Co.
H. J. Dinkmeyer, Chicago Auto Parts, Inc.
S. J. Levy, W. Bergman Company.
G. N. Lockridge, Kansas City Automobile Supply.

MOTOR AGE, June, 1938



"Isn't there some way we can hush this up — ? ?"

R. J. Loock, R. J. Loock & Company.
Malcolm McCormick, Walker Manufacturing Co.

C. W. McDaniel, Fostoria Pressed Steel Corporation.

A. E. Pouliot, National Bushing & Parts Company.

J. M. Spangler, National Carbon Co., Inc.

W. F. Wilkerson, Wyoming Automotive Co.

St. Louis Tool Co.

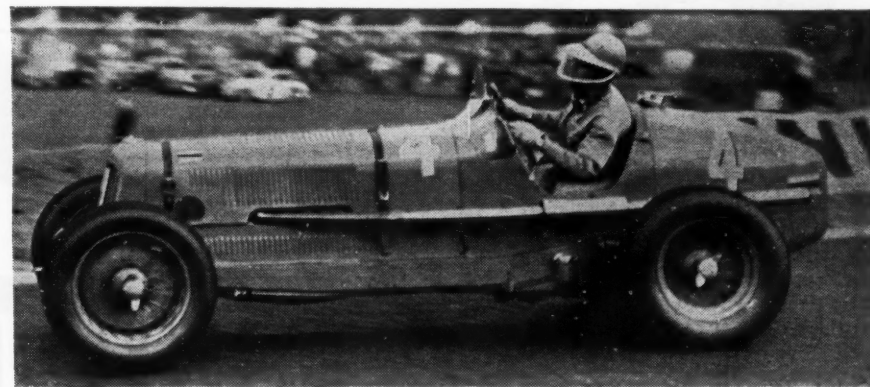
Has New President

The St. Louis Tool Co., St. Louis, Mo., has announced G. A. Coolidge as its new president. He succeeds J. D. Young, who has retired.

The St. Louis Tool Co. has been manufacturing cylinder boring and automotive service equipment since 1926, and will continue to specialize in the production of Fly Cutter type boring bars.

Goehrig Appointed Blackhawk Sales Manager

G. H. Goehrig, formerly assistant sales manager of the Blackhawk Mfg. Co., has been named sales manager succeeding W. P. Ferris, who has resigned to go into business for himself.



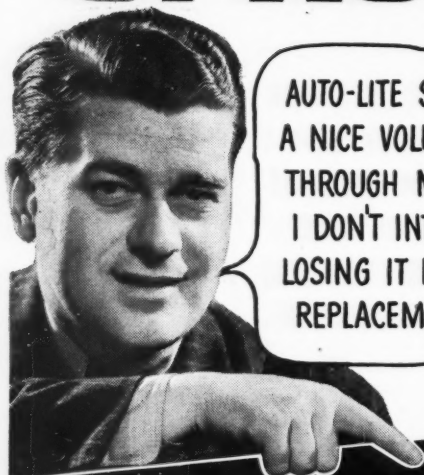
Prince of a racer is Prince Birabongse of Siam, shown here as he led the field in the final lap of the Coronation Race of England's Road Racing Club, near London.

German Hydroplane Sets World Distance Record

A new world's distance record for hydroplanes was set on March 29, by a Dornier No. 18 of the German Luft Hansa, equipped with two Junkers Jumo 205-C two-stroke Diesel engines. The machine was catapulted from the mothership Westfalen off the harbor of Plymouth, England, and flew without intermediate landing to Caravellas, Brazil, a distance of 5250 miles, at an average speed of 122.5 m.p.h. It was in charge of Hans Werner von Engel, one of Luft Hansa's ablest pilots, who has to his credit eighteen crossings of the Southern, and also several of the Northern, Atlantic. Besides Engel, the crew comprised Co-pilot Erich Gundermann and the two engine men.

The Junkers Jumo 205-C engine is a two-stroke Diesel engine of six cylinders having a bore of 4.13 in., and each cylinder contains two opposed pistons with a stroke of 6.30 in. each. The total displacement of the engine is thus 1014 cu. in. Its maximum output is 600 hp. and the cruising output 510 hp. Without propeller hub the engine weighs 1144 lbs., which makes the specific weight 1.914 lbs. per hp. The fuel consumption is 0.385 lb. per hp-hr. at maximum and 0.363 lb. per hp-hr. at the cruising output.

NEW HIGH IN VOLUME OF AUTO-LITE EQUIPPED CARS!

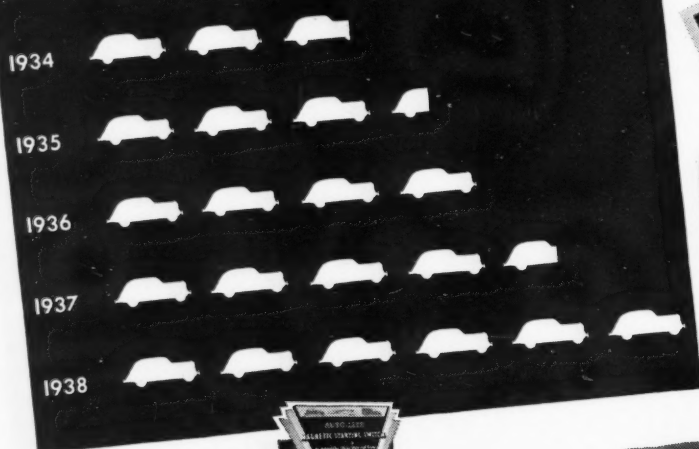


AUTO-LITE SERVICE KEEPS
A NICE VOLUME FLOWING
THROUGH MY SHOP AND
I DON'T INTEND TO RISK
LOSING IT BY USING CHEAP
REPLACEMENT PARTS

**AUTO-LITE NATIONAL ADVERTISING
IN LEADING PAPERS AND MAGAZINES**



**AUTO-LITE SERVICE AND PARTS MARKET
INCREASES 100% IN FOUR YEARS!**



THE AUTO-LITE NAME
REALLY MEANS SOMETHING
TO MOTORISTS!...I KEEP
MY PARTS CABINET RIGHT
OUT WHERE ALL CAN SEE IT
AND RECOGNIZE THE NAME

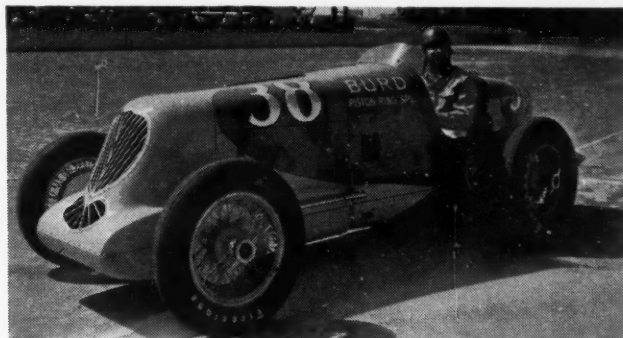
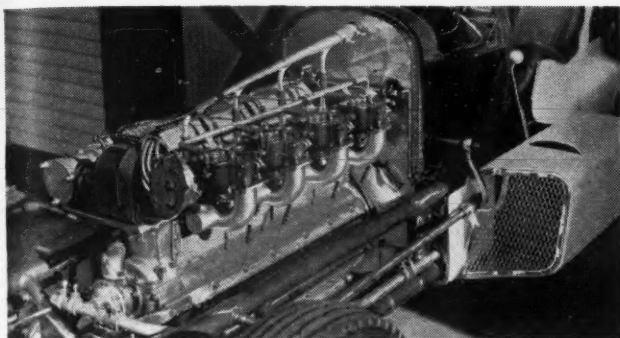
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for details.



AUTO-LITE

**STARTING
LIGHTING
IGNITION**



Miller engine in Harry McQuinn's Marchese Special and Chet Gardner in the Offenhauser powered job he rolled to fifth place.

Indianapolis Entrants

Car No.	Name	Driver	Engine Make	No. of Cylinders	Bore	Stroke	Displacement	Supercharged	Spark Plug	Ignition	Ignition Cable	Piston Ring	Carb.	Wheel Suspension	Shock Absorber	Brakes	Fuel	Oil	Weight	Qualifying Time	Car No.					
1	Shaw Special	W. Shaw	Off	4	4.260	4.500	256	N	C	B	P	P.C.	W	2	R	C	C	B	Gab	Gab	1848	120.987	1			
2	Miller-Hartz Special	Ted Horn	Miller	8	2.875	3.500	181	Y	C	B	P	P.C.	W	2	F	C	C	H	Hart	Hart	1984	121.327	2			
3	I. B. E. W. Special	Chet Miller	Off	4	4.250	4.500	255	N	C	B	P	P.C.	W	2	F	C	C	D	Houd	Houd	1855	121.898	3			
4	Miller Special	R. Hepburn	Miller	6	3.500	3.125	180.5	Y	C	B	P	Amer	M	1	4	Ind	Ind	C	M	M	H-d	Gulf	2155	.....	4	
5	Miller Special	Billy Winn	Miller	4	4.250	4.500	255	N	C	BT	P	Amer	M	2	R	Ind	Ind	C	M-H	M-H	H-d	Gulf	Gulf	1854	.....	5
6	Miller Special	Miller	Miller	4	4.250	4.500	255	N	C	BT	P	Amer	M	2	R	Ind	Ind	C	M-H	M-H	H-d	Gulf	Gulf	1828	.....	6
7	Bowes Seal Fast Special	McD	McD	4	4.073	4.750	247	N	C	B	P	P.C.	W	2	R	C	C	F	Houd	Houd	M	S	1832	.....	7	
8	Bowes Seal Fast Special	Lou Meyer	Mey-Off	8	2.968	3.250	179.5	Y	B	B	P	P.C.	W	2	R	C	C	H	Hart	Hart	H	Gil	Gil	2018	120.525	8
9	Sparks-Thorne Special	J. Snyder	Sparks	6	3.187	3.750	179.4	Y	C	B	P	P.C.	W	1	R	C	C	A	H-H	H-H	H	B	O	2014	123.506	9
10	I. B. E. W. Special	Bill Cummings	Miller	8	3.375	3.750	268	N	C	B	P	P.C.	M	4	F	C	C	D	Houd	Houd	M	Gulf	Gulf	1875	122.392	10
11	Alfa Romeo	Rex Mays	A-R	8	3.000	3.200	180.9	Y	C	B	P	P.C.	Web	2	R	Ind	C	H	Hart	Hart	H	Gil	Gil	1878	122.845	11
12	Kraft's Real Rye Special	C. Bergere	Miller	8	2.625	3.500	151	N	C	B	P	P.C.	W	4	R	C	C	H	Hart	Hart	H	B	B	1760	114.464	12
13	Belanger Special	T. Willman	Miller	8	3.312	3.750	258	N	C	B	P	P.C.	W	4	R	C	C	H	Hart	Hart	H	Gil	B	2144	118.458	13
14	Barbasol Special	Geo. Bailey	Duray	4	3.810	4.000	183	Y	C	B	P	P.C.	D	1	R	C	C	B	Lox	Lox	M	Gil	Gil	1950	116.393	14
15	D-X Special	R. Snowberger	Miller	4	4.260	4.500	256	N	C	B	P	P.C.	W	2	F	C	C	D	Houd	Houd	M	D-X	D-X	1860	124.027	15
16	Marks-Miller Special	G. Connors	Miller	4	4.275	4.630	266	N	C	B	P	P.C.	W	2	R	C	C	B	Hart	Hart	M	Gulf	Gulf	1884	120.326	16
17	Sparks-Thorne Special	R. Householder	Sparks	6	3.187	3.750	179.4	Y	C	B	P	P.C.	W	1	R	C	C	A	H-H	H-H	H	B	O	2002	125.769	17
18	Hamilton-Harris Special	T. Gulotta	Off	4	4.250	4.500	255	N	C	B	P	P.C.	W	2	R	C	C	B	Hart	Hart	M	Gil	B	1858	122.499	18
19	P.O.B. Perfect Seal Spl.	L. Tomei	Miller	4	4.260	4.500	256	N	C	B	P	P.C.	M	2	R	C	C	B	H-G	H-G	H	Gulf	Gulf	1852	121.594	19
20	Thorne Engineering Spl.	J. Thorne	Off	4	4.260	4.500	256	N	C	B	P	P.C.	W	2	F	C	C	B	G-F	G-F	H	Gulf	Gulf	2115	119.155	20
21	Burd Piston Ring Spl.	F. Roberts	Miller	4	4.328	4.875	272	N	C	B	P	Burd	W	2	R	C	C	B	H-H	H-H	H	Gulf	Gulf	1912	125.506	21
22	Sure Stop Brake Equal	F. Brisko	Brisko	6	3.625	4.375	270	N	C	B	P	P.C.	W	3	F	C	C	D	Houd	Houd	M	B	Gulf	2022	121.921	22
23	I. B. E. W. Special	Mauri Rose	Mas	6	2.560	2.950	91	Y	R	S	For	P.C.	Web	1	R	Ind	C	H	Mas	Houd	H	B	Gulf	1370	119.796	23
24	Indiana Fur Co. Special	F. Wearne	Off	4	4.328	4.875	270	N	C	B	P	P.C.	W	2	R	C	C	B	H-H	H-H	H	Gil	Gil	1938	121.425	24
25	Shafa 8 Special	C. Crawford	Buick	8	3.250	3.875	257	N	C	D	P	P.C.	W	4	R	C	C	D	Houd	Houd	M	Gil	Gil	2024	112.762	25
26	Hulbert-Duesenberg Spl.	F. Frame	Off	8	2.750	3.750	267	N	C	B	P	P.C.	Z	4	R	C	C	B	Houd	Houd	H	R.C.	Gulf	2077	116.279	26
27	Kimmel Special	H. Banks	Voelker	12	4.125	4.250	228	N	C	B	P	P.C.	W	2	R	C	C	B	Gab	Gab	M	Gil	Gil	1729	120.598	27
28	McCoy Auto Service Spl.	Babe Stapp	Miller	4	4.125	4.250	228	N	C	B	P	P.C.	W	2	R	C	C	B	Houd	Houd	H	B	Gulf	2030	119.827	28
29	Petillo Special	Kelly Petillo	Off	4	4.125	4.250	228	N	C	B	P	P.C.	W	2	R	C	C	B	Lox	Lox	H	T-T	Veedel	1850	116.791	29
30	Troy-Tydol Special	Al. Putnam	Miller	4	3.062	4.250	250.4	N	C	B	P	P.C.	W	4	R	C	C	D	Houd	Houd	H	Gulf	Gulf	2029	118.255	30
31	Greenfield Superservice	Ira Hall	Stude	8	4.260	4.500	256	N	C	B	P	Burd	W	2	R	C	C	B	H-H	H-H	M-H	Gulf	Gulf	2063	120.435	31
32	Burd Piston Ring Spl.	Chet Gardner	Off	4	4.260	4.500	256	N	C	B	P	Burd	W	2	R	C	C	B	H-H	H-H	M-H	Gulf	Gulf	2047	117.126	32
33	Elgin Piston Pin Spl.	Emil Andres	Brisko	6	3.625	4.375	271	N	C	B	P	P.C.	W	3	R	C	C	D	Houd	Houd	M	Gulf	Gulf	2047	117.126	33
34	Kohlert Special	Duke Nalon	Miller	8	2.656	3.500	155	N	C	B	P	P.C.	W	4	R	C	C	H	Hart	Hart	M	Gulf	O	1603	113.828	34
35	Miller Special	Rick Decker	Miller	8	2.875	3.500	182	N	C	B	P	P.C.	W	4	R	C	C	B	Houd	Houd	M	Gulf	Gulf	1806	119.492	35
36	Marchese Special	H. McQuinn	Miller	8	2.875	3.500	182	N	C	B	P	P.C.	W	4	R	C	C	B	Houd	Houd	M	Gulf	Gulf	1806	119.492	36
37	Ben Been Special	Doc Williams	Off	4	4.062	4.750	247	N	C	B	P	P.C.	W	2	F	C	C	D	Hart	Hart	M	Gulf	Gulf	1984	120.906	37
38	Kamm Special	S. Cantlon	Miller	4	3.875	3.875	183	Y	C	B	P	P.C.	W	2	R	C	C	D	Lox	Lox	H	M	Gulf	1965	120.906	38
39	Kirkham-Maserati Spl	Mas	Mas	8	4.250	4.625	262	N	C	B	P	P.C.	W	2	R	C	C	B	H-H	H-H	H	.....	.....	.....	.....	39
40	Stewart Special	M-B	M-B	4	4.312	4.250	248	N	C	B	P	P.C.	W	2	R	C	C	B	D	D	H	.....	.....	2172	.....	40
41	Sampson-Litz Special	Deacon Litz	Off	4	4.250	4.625	262	N	C	B	P	P.C.	W	2	R	C	C	B	H-H	H-H	H	.....	.....	1840	.....	41
42	Uhl Special	J. Sawyer	Dues.	8	4.250	4.500	255	N	C	B	P	P.C.	W	2	F	C	C	B	Gab	Gab	M	Gulf	Gulf	1968	119.022	42
43	Offenhauser Special	H. Arding	Off	4	4.250	4.500	255	N	C	B	P	P.C.	W	2	F	C	C	B	Gab	Gab	M	Gulf	Gulf	1968	119.022	43
44	Domonts Pepsi-Cola Spl.	Al. Miller	Miller	4	4.250	4.500	255	N	C	B	P	P.C.	M	2	R	C	C	B	Houd	Fag	H	Gulf	Gulf	2023	119.420	44
45	Clemons Special	J. Seymour	Clem.	4	3.500	3.625	139.5	Y	C	B	P	P.C.	W	2	R	C	C	B	Houd	Fag	H	Gulf	Gulf	2023	119.420	45
46	Miller-Duesenberg	J. Petticoat	Off	8	4.250	4.500	255	N	C	B	P	P.C.	W	2	R	C	C	D	H-H	H-H	H	Gil	Gil	1986	116.339	46
47	P. R. & W. Special	Billy DeVore	Off	4	4.250	4.500	255	N	C	B	P	P.C.	W	2	R	C	C	D	H-H	H-H	H	Gil	Gil	1986	116.339	47

Engine Make
Off—Offenhauser
A-R—Alfa Romeo
Stude—Studebaker
Mas—Maserati
M-B—Morton-Britt
McD—McDowell
Clem—Clemons
Dues—Duesenberg
Spark Plug
C—Champion

B—Bowes
R—Bosch
Ignition Cable
P—Packard
For—Foreign make
Ignition
B—Bosch
BT—Bosch, twin ignition
D—Delco
S—Swiss Scintilla

Piston Rings
P.C.—Perfect Circle
Amer—American
Hammered
Carburetor
W—Winfield
M—Miller
Web—Weber
D—Duray
Z—Zenith

ABBREVIATIONS:
Drive
F—Front
R—Rear
Wheel Suspension
C—Conventional
Ind—Independent
Starter
B—Bosch
D—Delco
H—Hand crank

A—Air drill
C—Cartridge
F—Ford
Shock Absorbers
Gab—Gabriel
Hart—Hartford
H-H—Hartford-Houde
Houd—Houde
Lov—Lovejoy
G-F—Gabriel-Fageol
D—Delco

M—Miller
Mas—Maserati
Brakes
H—Hydraulic
M—Mechanical
M-H—Mechanical, front
Hydraulic, rear
H-d—Hydraulic, disk type
Fuel
Gil—Gilmore

B—Alcohol blend
T-T—Troy-Tydol
Oil
Gil—Gilmore
O—Oilum
B—Baker (castor oil)
S—Stalube

How They Finished

Finish Position	Driver	Number of Car	Car	M.P.H.	Cause of Withdrawal	Number of Pit Stops	Withdrawn in Lap No.	Finish Position	Driver	Number of Car	Car	M.P.H.	Cause of Withdrawal	Number of Pit Stops	Withdrawn in Lap No.
1	Roberts	23	Burd Piston Ring	117.200		1		1	Bailey	12	Barbasol Special		Clutch failure	3	166
2	Shaw	1	Shaw Special	115.580		1		2	Snowberger	14	D-X Special		Con. rod broken	1	56
3	C. Miller	3	I. B. E. W. Special	114.946		2		3	Connors	15	Marks-Miller Special		Engine trouble	2	119
4	Horn	2	Miller-Hartz	112.203		3		4	Householder	16	Sparks-Thorne Special		Bkn. blower hose	4	154
5	Gardner	38	Burd Piston Ring	110.311		1		5	Gulotta	17	Hamilton-Harris		Bkn. con. rod	3	130
6	Arding	54	Offenhauser Special	109.843		4	199	6	Tomei	21	P. O. B. Perfect Seal		Bkn. con. rod	2	88
7	McQuinn	45	Marchese Special	108.694		3	197	7	Brisko	26	Sure Stop		Broken oil line	1	39
8	DeVore	58	P. R. & W. Special	102.080		4	185	8	Rose	27	I. B. E. W. Special		Blower frozen	4	165
9	Thorne	22	Thorne Eng. Special	102.009		1	185	9	Banks	33	Kimmel Special		Burned rod bear.	6	109
10	Wearne	29	Ind. Fur Co. Special	99.543		3	181	10	Stapp	34	McCoy Auto Special		Broken valve	1	54
	Nalon	43	Kohlert Special		Run, at finish	2	178	11	Petillo	35	Petillo Special		Camshaft seized	1	100
	Meyer	5	Bowes Seal Fast		Oil pump failure	5	149	12	Putnam	36	Troy-Tydol Special		Bkn. crankshaft	1	15
	Snyder	6	Sparks-Thorne		Bkn. blower hose	3	150	13	Hall	37	Greenfield S. S.		Eng. seized, wrkd.	2	44
	Cummings	7	I. B. E. W. Special		Rad. tank leaking	4	72	14	Andres	42	Elgin Piston Pin		Bkn. wheel, wrkd.	1	45
	Mays	8	Alfa Romeo		Frozen blower	1	45	15	Cantlon	47	Kamm Special		Blower loose	2	13
	Bergere	9	Kraft's Real Rye		Broken piston	2	111	16	A. Miller	55	Domont's Special		Clutch failure	3	125
	Willman	10	Belanger Special		Broken valve	1	47								

Flat Rate Prices on 1938 Pontiac 8

Model 38-28—DA

Starting Serial Number: 8DA-1001

3¼ in. bore x 3¾ in. stroke. Piston Dis. 248.9 cu. in. A.M.A. Hp. 33.8

OPR. LAB. MAT. MFR				OPR. LAB. MAT. MFR				OPR. LAB. MAT. MFR				OPR. LAB. MAT. MFR				OPR. LAB. MAT. MFR			
A				C—contd.				G—contd.				O—contd.				U			
			HR.				HR.				HR.				HR.				HR.
5	7.00	4.00	3.4	3	9.00	6.25	4.3	5	16.75	8.70	7.0	4	6.25	1.50	2.7	1	.40	....	N.O.
6	1.75	3.60	1.4	3x	4.00	28.75	2.0	6	19.15	17.50	N.O.	5	7.55	3.00	N.O.	2	1.00	.80	.3
7	9.30	....	N.O.	4x	.40	1.10	.2	7	.50	.60	.3	6	.30	2.65	.7	3	1.25	....	.3
7x	3.00	6.85	1.3	5	.40	....	.2	9	4.00	4.60	N.O.	7	.75	1.15	.3	3x	.60	....	.1
7y	2.65	1.80	1.2	6	.40	....	.2	10a	8.25	8.75	4.3	8	9.55	....	3.8	4	.40	....	.3
8	5.50	....	N.O.	7x	.70	....	.4	11	12.40	9.75	4.9	9	9.50	....	N.O.	6	.75	....	\$0.40
8x	2.50	....	N.O.	8	.40	1.50	N.C.	13	4.05	5.65	.7	11	8.50	8.60	3.8	6x	.75	3.25	.3
8y	8.00	....	1.8	10x	.75	1.50	.4	14	39.45	45.00	13.3	12	1.25	8.25	N.O.	7	1.65	....	.7
9	3.55	....	1.3	11	1.50	.15	.7					13	1.25	2.00	.0	7a	1.80	....	1.0
9x	1.25	....	.5	12	1.75	....	.9					14	9.75	2.35	N.O.	7x	.60	.40	.3
10	.90	.50	.4									15	10.75	10.85	4.6	9	1.65	.50	.9
11	3.00	....	1.3									16	1.00	....	.5	10	1.80	.40	N.O.
12	3.50	....	N.O.	2x	1.80	.40	.9					18	2.00	....	1.0	11	2.65	5.00	.9
13	1.35	....	.8	3	2.25	.60	N.O.	1x	7.25	4.10	N.O.					12	.80	....	.4
14	6.25	....	2.3	4	.80	.15	.3	1a	4.50	2.75	N.O.					12a	3.40	1.80	1.2
15	1.25	.70	.3	5	.80	.25	N.O.	2	2.00	....	N.O.					12b	1.25	1.80	N.O.
16	1.00	....	.2	6	.65	.10	.4	2a	.25	....	N.O.	1	5.00	.25	2.5	13	1.00	....	.4
18	.90	....	.2	7	1.90	.35	.9	5	4.45	3.75	2.4	1x	10.00	.90	N.O.	13a	3.20	....	1.6
20	3.50	11.65	1.9	7x	3.75	....	1.4	5x	.45	1.00	.2	3	12.00	....	5.0	13b	1.50	3.20	N.O.
21	3.00	9.60	N.O.	7y	2.50	7.35	1.2	6	2.00	8.00	N.O.	4	2.25	....	N.O.	14	2.65	5.40	N.O.
22	2.50	1.15	1.3	8x	.75	....	N.C.					5	10.00	11.90	N.O.	15y	1.55	3.50	1.4
23	2.75	1.40	1.4	9	2.50	....	1.5					6	6.00	....	2.5	16a	1.80	7.00	1.0
24	3.25	....	1.8	10	1.25	....	.6					7	1.80	5.25	N.O.	17	.75	1.50	.3
				11	1.60	.05	3									17a	.80	.65	.5
				11x	1.85	....	N.O.	5	5.00	8.00	2.0					17x	.90	1.00	.5
				12	2.00	3.95	1.0	6	9.85	16.00	N.O.					18	7.00	....	3.5
				13	1.00	1.85	.5	8	2.00	16.00	N.O.					19	.75	....	.3
				15	2.50	6.35	1.5	9	5.25	5.15	N.O.					20	.50	.30	.2
				16	1.50	1.90	.7	10	1.25	2.40	.4					22	.90	4.00	.2
								11	2.00	.35	3.1					22x	1.50	....	.5
																23	.75	....	.3
																24	.90	.85	.5
																25	1.00	....	.4

N.O. = No Factory Operation.

N.C. = No Charge.

Factory Hours from "Pontiac 1938 Flat Rate"

® IMPORTANT: Short cuts and footnotes. Read below before quoting prices

- | | | |
|---|---|--|
| <p>Ⓜ A11, 14—Add \$1.00 for cars equipped with safety shift.</p> <p>Ⓜ A20—Material price applies to renewal of shock absorber, pivot pin and bushing.</p> <p>Ⓜ B8c—Applies to renewal of hand brake cable.</p> <p>Ⓜ B15—Front only, rear N.C.</p> <p>Ⓜ D11—Priced for fuel pump only, combination pump \$.90.</p> <p>Ⓜ D11x—Priced for fuel pump only, combination pump \$2.85.</p> | <p>Ⓜ F3—Includes block with pistons, pins and rings.</p> <p>Ⓜ F19—Applies to new spring in regulator.</p> <p>Ⓜ O3, 4, 8—Add \$.50 for cars equipped with safety shift.</p> <p>Ⓜ P1, 3—Add \$.50 for cars equipped with safety shift.</p> <p>Ⓜ Q6—Applies to rear propeller shaft.</p> <p style="text-align: center;">MANUFACTURER HOURS</p> <p>Ⓜ A9—Applies to installation of new ends.</p> | <p>Ⓜ A11, 14—Add .6 hr. for cars with safety shift.</p> <p>Ⓜ D11—Applies to fuel pump only, combination pump .5 hr.</p> <p>Ⓜ E2—Does not include repack pump.</p> <p>Ⓜ F3—Applies to installation of block fitted with pistons, pins and rings.</p> <p>Ⓜ L1A—Does not include tune-up or valve adjustment.</p> <p>Ⓜ O3, 4, 8—Add .3 hr. for cars with safety shift.</p> <p>Ⓜ P1—Add .3 hr. for cars with safety shift.</p> |
|---|---|--|

MANUFACTURER HOURS

- Ⓡ A9—Applies to installation of new ends.

TUNE-UP AND REPAIR DATA

Main Bearings: Steel backed, white bearing alloy. Renewable from below.

Rod Bearings: Steel backed, white bearing, alloy slip in.

Rod and piston assemblies are removed from above.

Tappet Clearance: Inlet .011-.013 in.
Exh. .011-.013 in. Hot.

Valve Timing: With inlet tappet set to .015 in. valve opens 5 deg. or 2 fly-

.015 in. Valve opens 3 deg. before wheel teeth before T.C. With exhaust tappet set to .015 in. Exh.

haust tappet set to .015 in. Exn. closes 5 deg., or 2 flywheel teeth after T.C. Marks on cam and

after T.C. Marks on cam and crankshaft sprockets should be nearest each other and on line be-

nearest each other and on line between shaft centers.

deg. before T.C., or when the mark
IGN lines up with pointer.

Timing Mark Location: On flywheel.
Seat Angle of Valves: Intake 30 deg.

Seat Angle of Valves: Intake 30 deg.,
exhaust 45 deg.
Car Serial Number Located: Left side

Car Serial Number Located: Left side
of frame under hood.
Engine Number Located: Left front of

Engine Number Located: Left front of block.

Interrupter Point Gap: .015 in.
Spark Plugs: Std. AC45, Set to .025 in.

Firing Order: 1-6-2-5-8-3-7-4.
Number of Flywheel Teeth: 139.

Brake Make, and Drum Diam: Bendix Hydraulic, 12 in.

Brake Lining Total Length: Front: 3
ft 10 1/4 in x 13 1/2 in x 3/16 in

Rear: Same. **Hand:** Uses rear service chocks.

Oil Capacity Crankcase in Qts.: 7.
Transmission Oil, Lbs. or Pts.: 13½.

Differential Oil, Lbs. or Pts. 3.

Cooling System Capacity: 19 qts.
Oil Pressure: 35-40 lbs. at 40 m.p.h.

Compression Gage Pressure: 140
at 1000 r.p.m.

Generator Rate Adjustment: The brush and voltage regulator

brush and voltage regulator.
Steering Gear: Saginaw worm and

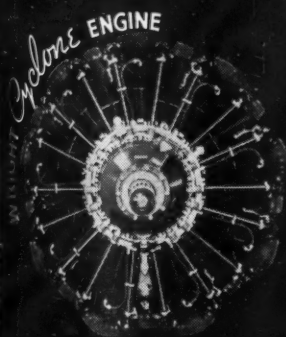
Carburetor: Carter 400S.

Rear Axle: Own, semi-floating.

Universal Joints: Mechanics need

Battery Terminal Grounded: Negat

In "Cyclones" ...dag is used!



Well-known to technical men are the stresses and strains set up in the operation of modern airplane power plants. It is, therefore, significant that "dag" colloidal graphite is being selected by an increasing number of engine manufacturers as the auxiliary lubricant to use in combating these wear-producing conditions.

In an industry where positive performance

is vital, where "check and double check" is the watchword, materials and equipment accepted must undergo rigid test.

The use of "dag" colloidal graphite by the **WRIGHT AERONAUTICAL CORPORATION** is a powerful testimonial. They find that the graphoid surface gives added protection to the metal parts subjected to high temperatures and heavy pressures. All overhaul and repair jobs are set up and assembled with "dag". Write for technical data.

ACHESON COLLOIDS CORPORATION
PORT HURON, MICHIGAN



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Floyd Roberts Wins 500 Mile Classic at Indianapolis

(Continued from page 12)

tane, with some cars using a blend of alcohol, benzol and lead which boosted the octane rating to 100 and over. Compression ratios were upped in practically all cases, ranging around 12 to 1.

Oil coolers were in more general use than ever before, brakes were larger and were air-cooled by scoops installed in the front of the brake

backing plates, with corresponding ventilator openings at the rear.

The two Sparks-Thorne Specials were equipped with a new type of steering connections consisting of needle bearings in place of the conventional ball-and-socket type. The drag link was fitted with a double yoke at the pitman arm end, the yokes being 90 deg. from each other. One yoke straddled the pitman arm, in which was a needle bearing. The other yoke attached to the drag link which also had needle bearings. The connection at the steering arm was another needle bearing, and there were needle bearings in the steering arms for the tie rod connections.

A tubular steel frame appeared in

the Marchese Special, Car Number 45, and was the only car in the race with this type of frame. To achieve the utmost in streamline effect, the water-cooling radiator was moved from the front and placed on each side of the body where the running boards of the conventional passenger car are located. Powered by a new 8-cylinder Miller engine of 182 cu. in., without a blower, this car really gave the boys something to think about.

Although there were several new cars entered, and enough new mechanical features offered to fill a book, the car that was the most outstanding and which caused the most comment was the rear-engined Miller designed by Harry Miller. Powered by a new 6-cylinder engine which was turned end-for-end and mounted in the rear at an angle of approximately 45 degrees from vertical, the job fairly bristled with new ideas. The engine had a bore of 3.5 in., and a stroke of 3.125 in., and a displacement of 180.5 cu. in., was equipped with a Roots type blower and a single carburetor of Miller design.

The exhaust pipe was mounted on top of the engine, extending through a slot in the rear of the body. Openings on each side of the driver's seat admitted air to the exhaust pipe, thereby forming a draft into which the exhaust gas was discharged, eliminating any possibility of back pressure building up in the exhaust pipe.

Drive was to all four wheels which were independently sprung on transverse springs. One drive shaft extended from the flywheel to the transmission which was located in the front of the car ahead of the driver's feet, and furnished the driving power for the front differential. An additional constant-mesh counter gear in the transmission powered another drive shaft back to the rear differential. The transmission was equipped with four forward speeds and a reverse, and was unusual in that the gears did not run in oil. The lubricant was pumped to the bearings, the throw-off supplying lubrication to the gear teeth, and when the lubricant dropped down to the bottom of the case a scavenger pump returned it to the reservoir. Provision was made for replacing the transmission gears with other sets of different ratios so that the car could be used for different types of racing. This feature eliminates the necessity of changing differential gears, an operation which requires about two days.

Brakes on this job were the hydraulic disk type, operating similar to the conventional clutch, and had 90 sq. in. of braking area on each wheel. In place of the conventional starter, this car was equipped with a cartridge type of starter. A shell similar to a shot-gun shell was discharged in a tube leading to the starting motor. The concussion of this charge acted upon a piston in the starter, throwing the starter gear in mesh with the starting jaw on the front end of the crankshaft.

It was a great disappointment when this car failed to qualify. The final deadline in which qualifying trials could be run was set at 4 o'clock on the Saturday before the race. The car crossed the starting line just seconds after 4 o'clock and was declared ineligible.

SAFETY LIGHTING



for goodness' sake!

INSTALL K-D LAMPS

for goodness' sake . . . for
safety's sake . . . because they
are built on **QUALITY** and
PERFORMANCE.

Write for

NEW 1938 K-D CATALOG AND I. C. C. CHARTS



**S.A.E. Tested.
Approved in
various states.**

COMBINATION CLEARANCE AND MARKER LIGHTS

Model No. 517 streamlined. Special lens.
For curved bodies.

Model No. 518 turtle back. Special lens.
For flat bodies.



Model No. 510
CLEARANCE LAMP.
Two-direction light
with rigid bracket.



Model No. 326
TRIFLEX REFLECTOR
Special shatterproof lens.



Model No. 506
CLEARANCE LAMP.
Rigid angle bracket.

THE K-D LAMP CO.

CINCINNATI, OHIO

AUTO-LITE 2-PURPOSE ADVERTISING PROGRAM *PUTS NEW SPARK PLUG SALES DRIVE IN*



An important share
of the Auto-Lite Spark Plug advertising appropriation is set aside to identify the Auto-Lite Dealer to the motor car owners of his community.

There are two jobs to do—first, to fire the interest of America's 30,000,000 motorists in a "new kind of spark plug"—then tell them, and show them, *where to buy it!*

Old timers in the automotive field are saying, "Better hook up with Auto-Lite." In all their years in the business they've never seen anything like the intensive drive to bring business in to dealers that Auto-Lite is putting on.

Ask your friends who already handle this new kind of spark plug, "*How are you doing with Auto-Lite?*"

AUTO-LITE *Parade of Stars*
IDENTIFIES AUTO-LITE DEALERS TO MILLIONS OF MOVIE GOERS



"Labor Holiday" Hits Goodrich Plant

With its negotiations with the United Rubber Workers Union deadlocked over the issue of paid vacations, with all its Akron factories and warehouses picketed by the union and with 1500 office workers and employees barred from its offices by strong picket lines, the B. F. Goodrich Co. hurriedly set up emergency offices in downtown Akron office buildings May 24, apparently "digging in" for a protracted siege with labor. Although officials of the URW carefully shunned any use of the word "strike" and termed the episode a "labor holiday," hundreds of Goodrich CIO union men and

women barricaded all gates to the Goodrich properties, setting up shanties and lean-to shelters. Wives of the union men immediately established soup kitchens, relaying hot food to the picketers, who reported for duty at their regular factory shift hours.

The Goodrich-URW controversy which has flared spasmodically and has kept all Akron business in a turmoil since early last March, surged to a dramatic climax May 19 when electricians pulled switches, threw the gigantic Goodrich plants into darkness and cut off power from all ma-

chines, in protest over layoff notices given 25 veteran electricians. Union officials claimed apprentice electricians had been retained, in violation of the union's seniority rules. Picket lines were hurriedly set up and the incoming midnight shift workers were blocked. They at once reinforced the picket lines. T. G. Graham, vice-president, and a corps of maintenance men managed to enter the plant before all picket lines were established. When 1500 office workers reported for duty the following morning, they were turned back by the union.

The "labor holiday" affects 9300 factory and office employees. It is the first complete Goodrich shutdown. In 1936 Goodyear was closed six weeks by strike of the CIO and a year ago the Firestone Akron factories were closed eight weeks.

When union negotiators conferred with Graham inside the picketed plant, a long list of "grievances" was submitted by the union. Although the immediate cause of the crisis—the layoff notices given veteran electricians—was quickly adjusted through the company's agreement to retain the older men and lay off the apprentices, and although other minor grievances were settled, the negotiations for four days impinged upon the one issue of paid vacations. Union leaders are demanding one week paid vacation for five-year workers and two-week vacations for workers with 10 years or more service records. At one stage in the negotiations the company attempted to compromise the deadlocked issue by offering each employee entitled to a vacation a tire for his car in lieu of cash for each vacation week. The union refused the offer.

The Goodrich-URW controversy started when Graham announced that unless the union accepted wage cuts averaging 12.3 per cent the company would be compelled to transfer 5000 jobs out of Akron.

Auto Compass

A new style auto compass has been introduced by the U. S. Gauge Co., 44 Beaver St., New York City. Easily mounted by either a suction cup or a bracket, the beige colored Tenite housing with highly polished chromium band and fittings adds a note of smartness to the car interior. The white dial markings are easily read. The



dial floats in a clear non-freezing liquid and is steady under all conditions. An entirely new type of compensator, which is an integral part of the compass, makes it possible to compensate correctly and easily for any errors caused by the magnetic influence of the steel body of the car. List price \$2.95.



All LAMSON 1035

Double Heat Treated Cap Screws Have the Extra Length Thread



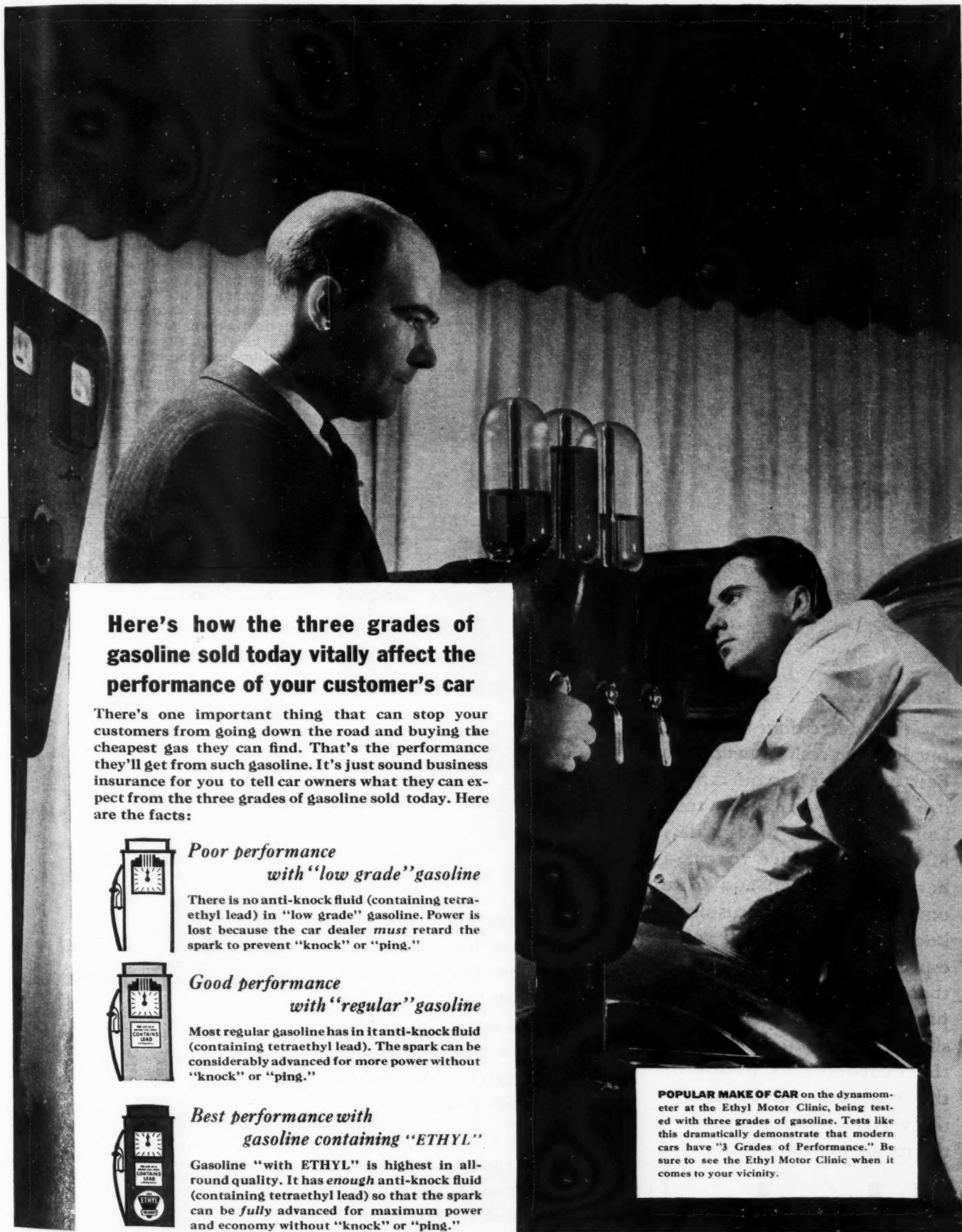
Less than 1 out of 5 service repair shops could ever afford to stock a complete assortment of the necessary sizes of bolts, nuts, cotters and cap screws needed for repair service until LAMSON & SESSIONS offered to the trade the LAMSON Treasure Chest—steel cabinet containing 118 different sizes and kinds of fastenings in 15 plainly labeled drawers. Included in this complete stock are the famous LAMSON 1035 Double Heat Treated Cap Screws with the Extra Length Thread which eliminates dozens of odd sizes seldom used but which you must have on hand. The extra long thread takes care of most sizes not stocked! Ask your Jobber's salesman about the LAMSON "25" Line now.

THE LAMSON & SESSIONS CO.

GENERAL OFFICES, CLEVELAND, OHIO

Manufacturers of the LAMSON "25" LINE

YOUR CHOICE OF 3 GRADES OF PERFORMANCE



Here's how the three grades of gasoline sold today vitally affect the performance of your customer's car

There's one important thing that can stop your customers from going down the road and buying the cheapest gas they can find. That's the performance they'll get from such gasoline. It's just sound business insurance for you to tell car owners what they can expect from the three grades of gasoline sold today. Here are the facts:



Poor performance with "low grade" gasoline

There is no anti-knock fluid (containing tetraethyl lead) in "low grade" gasoline. Power is lost because the car dealer *must* retard the spark to prevent "knock" or "ping."



Good performance with "regular" gasoline

Most regular gasoline has in it anti-knock fluid (containing tetraethyl lead). The spark can be considerably advanced for more power without "knock" or "ping."



Best performance with gasoline containing "ETHYL"

Gasoline "with ETHYL" is highest in all-round quality. It has *enough* anti-knock fluid (containing tetraethyl lead) so that the spark can be *fully* advanced for maximum power and economy without "knock" or "ping."

POPULAR MAKE OF CAR on the dynamometer at the Ethyl Motor Clinic, being tested with three grades of gasoline. Tests like this dramatically demonstrate that modern cars have "3 Grades of Performance." Be sure to see the Ethyl Motor Clinic when it comes to your vicinity.

ETHYL GASOLINE CORPORATION, manufacturer of anti-knock fluids used by oil companies to improve gasoline

MOTOR AGE, June, 1938

When writing to advertisers please mention Motor Age

AAA Recognizes "Growing" Midgets

With midget racing having become "big business," the American Automobile Association's Contest Board has opened a supervisory office in Rockefeller Center, New York City. Al Stewart, top ranking official in big car and midget circles and official starter in major events, including the Roosevelt Raceway's classics, has been placed in charge of the headquarters, Ted Allen, secretary of the board said at national offices in Washington, D. C.

Stewart's office is quartered in the metropolitan offices of the automobile

association's foreign travel service. There Stewart will maintain a clearing house for allocation of midget entries on dates having events at more than one track. He also will conduct a central call location to which drivers and car owners may check in for information of schedules.

Allen said the New York office would devote the bulk of its time to the midgets and that the big-car events would be handled through the Washington, D. C., headquarters as in the past. Washington also will supervise activities of the Manhattan branch office.

The office established in New York a few weeks ago is the first racing

headquarters of the AAA there since the early 1900's when all speed events were supervised in Manhattan. The AAA later moved its Contest Board offices to national headquarters at Washington, D. C., where the nation's leading speed events have since been supervised.

Allen said the AAA this year will supervise some 250 midget races—a schedule longer than the big cars have so far claimed for the year—and the purse for the vest-pocket racers will total some \$200,000.

United Motors Service

Appoints W. N. Potter

C. B. Stiffler, president and general manager of United Motors Service announces the appointment of W. N. Potter as vice-president and general sales manager.

For the last two years he has been products manager, and in this position has been responsible for factory relations and the field programs on all United Motors lines in the United States.

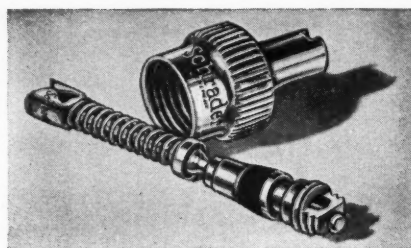
K-S Electric Fuel Pump

Culminating over three years of development, announcement is made of a new electrically-operated fuel pump produced by the King-Seeley Corp., Ann Arbor, Mich. It is of the pusher type and has a delivery capacity of 40 gallons per hour, free flow, 20 gallons per hour being about the normal range under average operating conditions.

The new unit can readily be applied on any passenger car, truck, bus, industrial power units, stationary engines, etc. Maximum running



... the easiest dime you ever put in your cash drawer. The best part of it is, you can do it every time you repair a tube and that is many times a day. Make it a practice to use a new Schrader Cap and Core on every job. Your customer knows it's a dime well spent especially when you tell him that the repair plus the new parts make a 100% job. Just show the old cap and core to the customer as proof of the replacement. A new tire valve cap always makes the repair job look better.



Schrader Caps and Cores are known. They have been the standard new tire equipment for more than forty years. Buy them in this attractive display merchandiser which identifies you as a dealer and user of quality products.

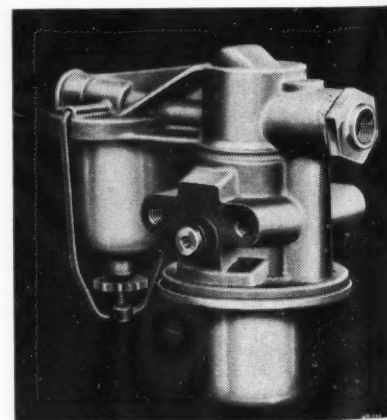
For service work Schrader Tire Valve Caps and Cores are also packed in economical bulk packages of 100.



Schrader

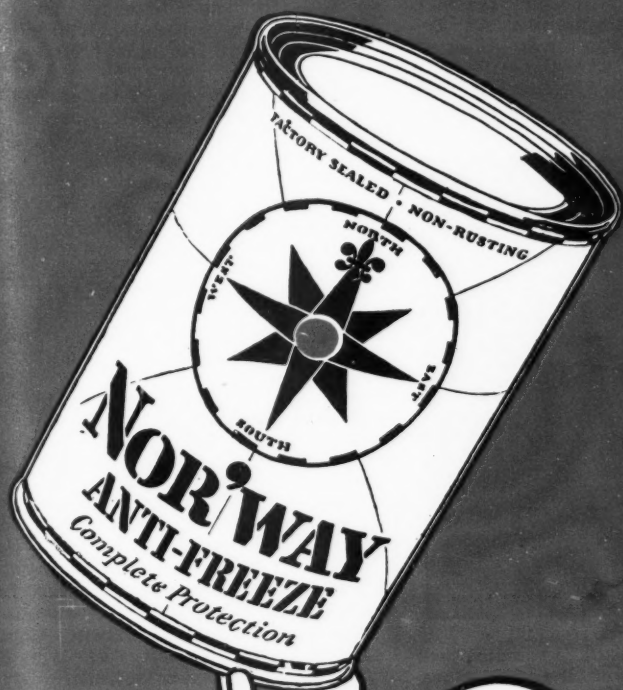
REG. U.S. PAT. OFF.

A. SCHRADER'S SON, Division of Scovill Manufacturing Company, Incorporated, BROOKLYN, N. Y.



pressure is only 2½ lbs. per sq. in., idling. Current draw is about 2 amperes at 10 gallons per hour, and a maximum of under 2¼ amperes at 30 gallons per hour.

The unit combines a fuel bowl and strainer element at one end and the pumping mechanism at the other. Pumping action is accomplished by means of a piston with two balanced and automatically-acting valves, operated by solenoid action. When a maximum pressure of 2½ lbs. is reached, the fuel is circulated within the pump through a by-pass, so that no further pressure rise is built up in the fuel system.



STRONGER!
MORE
ECONOMICAL!
PRACTICALLY
ODORLESS!



**NEW PROGRAM
INCLUDES:**

PRACTICAL SALES HELPS

EXCLUSIVE SERVICE AIDS

**INTENSIVE CONSUMER
ADVERTISING**

ASK YOUR JOBBER

NOR'WAY

RELIABLE SERVICE ANTI-FREEZE

© Commercial Solvents Corporation

COMMERCIAL SOLVENTS CORPORATION

NEW YORK CENTRAL BUILDING, NEW YORK, N. Y.

General Motors

April Car Sales

April sales of General Motors cars to dealers in the United States and Canada, together with shipments overseas, totaled 109,659, compared with 238,377 in April a year ago. Sales in March were 109,555. Sales for the first four months of 1938 totaled 407,930, compared with 677,577 for the same four months of 1937.

Sales of General Motors cars to consumers in the United States totaled 103,534 in April, compared with 198,146 in April a year ago. Sales in March were 100,022. Sales for the first four months of 1938 totaled 329,456, compared with 538,839 for the same four months of 1937.

Sales of General Motors cars to dealers in the United States totaled 78,525 in April, compared with 199,532 in April a year ago. Sales in March were 76,142. Sales for the first four months of 1938 totaled 275,376, compared with 536,713 for the same four months of 1937.

Race Fans Point

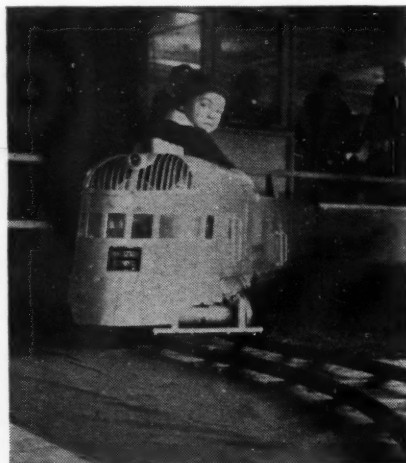
To Syracuse Century

With the Indianapolis Speedway having written its twenty-sixth chapter into racing's history, the big league drivers are looking forward to the next "big one" next September 10 at the New York State Fair in Syracuse.

With Roosevelt Raceway off the schedule this year, the wait for the season's second title classic is longer than it has been in many years.

Even the 200 National Championship points offered there will not upset the crowning of the season's Champion at Indianapolis. At Indianapolis, 1,000 points were allotted for first place.

The Syracuse classic, an annual event, will be 100 miles and will at-



Far cry from torque wrenches are miniature trains, yet the Miniature Train & Railroad Co. of Glen Ellyn, Ill., manufactures both. Junior seems to be enjoying his ride on the miniature streamliner.

tract a field of drivers representative of the Indianapolis entry roster. A sprint program originally scheduled for September 9 at Syracuse as a prelude to the century grind has been cancelled by Fair officials.

June is the "leanest" month of the season's schedule, which closes October 16 at Hohokus (N.J.) Speedway.

The three events of the month are: June 5, Milwaukee, Wis., Fairgrounds; June 12, Cook County Fairgrounds, Chicago, Ill.; and June 19, Langhorne (Pa.) Speedway.

Six events will be run in July, as follows: July 4, Hohokus (N.J.) Speedway and Lakewood Speedway, Atlanta, Ga.; July 10, Cook County Fairgrounds, Chicago; July 17, Milwaukee (Wis.) Fairgrounds; July 23, Mineola (L.I.) Fairgrounds; July 30, Harrington (Del.) Fairgrounds.

Mack-International

Appointments

At a meeting of the Board of Directors of Mack Trucks, Inc., on May 3rd, F. F. Staniford was elected president of the company's subsidiary, Mack - International Motor Truck Corp. Mr. Staniford also was elected vice-president of the parent company. In his new capacity he will have charge of all sales activities.

Effective May 1, 1938, Mr. R. D. Hilty was elected vice-president of the Mack-International Motor Truck Corporation.

STOPPING QUICKLY,  SURELY,
SMOOTHLY, QUIETLY, LETS MOTORISTS GO HAPPILY. 
ITS A SPECIALIST'S JOB COACHING  EIGHT
PIECES OF LINING INTO A PERFECTLY BALANCED 
TEAM, BUT IT SURE CUTS OUT  THE COMPETITION.
GREY-ROCK'S PLAN MAKES ANY GOOD MECHANIC A
SPECIALIST ON BIG  CARS OR LITTLE  ONES.



Grey-Rock B

Profit Class

(Continued from page 13)

something—so long as they just pass by they're not much good to you.

"So what?"

"So you look on advertising as a necessary business investment and immediately all of your thinking becomes different. You set aside a definite amount of money to pay for advertising—and because you or your bookkeeper labels it as an expense item you think, and plan, and then spend the money where it will do you the most good—where it will bring in the most customers.

"How much to set aside? My experience in the automotive service business over a long period of years suggests that from 3 to 5 per cent of your service sales. Four per cent is a reasonable figure and 3 per cent is the minimum for practically any service business to spend if it is to maintain a minimum number of car owner contacts. You know how much business you did last year—take 3, preferably 4 per cent, of that and that shows what your advertising investment for the year ought to be.

"And, of course, you do more than write down some figures for advertising in your books or on the back of an envelope. You plan how you'll spend it, and when your plans are complete you'll see that the money is available and that it's spent. Otherwise, you have just gone through a lot of motions.

"Always bear in mind that the money you have set aside for advertising is a business investment, because when you look at it in that way you will plan carefully to get the most for that money. Remember that you are spending it to get more cars to drive into your place of business.

"What service do you perform that most car owners need most often? Do they know they need it, and are they willing to go to some shop for it regularly? If so, that is the thing to tell them about so they'll come to your shop instead of going somewhere else or, worse still, neglect coming any place at all. That is advertising's job—to bring them in. No matter whether their cars are falling apart and you have the best equipped shop

and the best mechanics in town, you must get them to drive into your place. You can't sell a thing if you don't bring them in.

"How, where and when to advertise are important questions, too, but the first step is the most important—to recognize advertising as a necessary business investment, to set aside a definite amount for that investment based on your sales, and then to plan carefully how to spend that money. When you have come that far you are off to a good start.



"In this connection the independent service man has many opportunities to make his advertising dollars go farther. Display signs, complete direct mail campaigns, newspaper mats and copy prepared by professional advertising experts are available from many progressive manufacturers. They are prepared in large quantities for shops all over the country and their cost to individual shops is spread out to an extent that gives the individual purchaser of this material much more for his money. In many cases it has the additional advantage of being directly identified with national consumer advertising paid for by the factories.


"Check with your jobber salesman. He is in a position to tell you about the advertising help available from the factories his house represents. With his help it is possible to develop a complete campaign—the type of campaign that is necessary these days if more cars are to be attracted to your shop."



"Don't ask me how I got here! Will ya hand me the pliers, please?"

YOUR GREY-ROCK JOBBER  HAS BALANCED BRAKSETS
NUMBERED  TO BALANCE BRAKES ON SPECIFIC CARS.

HE ALSO HAS GREY-ROCK'S BRAKE BALANCING CHART 
EVERY MEAN TRICK OF BRAKES ANALYZED  BY THE
ENGINEERS WHO DEVELOP MOST NEW-CAR LININGS.

HANG UP THE  GREY-ROCK SIGN FOR BETTER
BRAKE JOBS AND MORE BUSINESS.

BALANCED BRAKSETS



Business is good at the U. S. Air Compressor factory in Cleveland as can be noticed by the photograph taken May 6th. The picture shows a section of the air compressor department, as a large number of vertical, two-stage compressors with 24" x 60" tanks were being assembled for shipment.

Francois Appointed to Hollingshead Staff



Paul L. Francois

The Hollingshead Corp., Camden, J., manufacturers of "Whiz" products, has announced the appointment of Paul L. Francois as assistant sales manager. He succeeds Oscar W. Morgenstern, who resigned to become an official of the Airolite Co., Marietta, Ohio.

Mr. Francois is known as the originator of embossed, registered serial numbered can tops and cases as an effective means of price control and was the first to package 188 alcohol to sell at 20 cents per qt., 80 cents per gal. He has several patented, widely distributed dealer selling aids to his credit and is a member of the Philadelphia Society of Engineers.

Exide

(Continued from page 16)

and passes out the other in the form of Exide Batteries.

There are company branches, depots and operating departments with engineering field service in 19 cities strategically located throughout the country. Over 30,000 Exide dealers in United States alone render Exide automobile battery service.

Although the manufacture of Exide Batteries for automobiles is one of the company's major activities, it is not the only one. The variety of uses to which Exides are put is as wide as industry, science and commerce. Because of the function performed by the storage battery in the application of electricity in the daily life of the nation, Exides play an important part.

The activities of this company in the automotive field actually began with the advent of the automobile, or "horseless carriage age." In the early days of the industry, the products of the company were used for the operation of electric carriages and to some extent as "sparking" or ignition batteries for gas cars. In 1911, the first stock car to have an electric "self-starter" made its appearance and it was equipped with an Exide.

This marked the beginning of the expansion of this department of the company's business. Two years later, in 1913, the company began its national advertising of Exide batteries for automobiles and has consistently maintained it ever since. Out of this advertising has emerged the company's now famous slogan: "When it's an Exide, you start!"

IGNITION PARTS ODDITIES

TUNGSTEN DEFIES
NITRIC, SULPHURIC
AND HYDROFLUORIC
ACIDS!

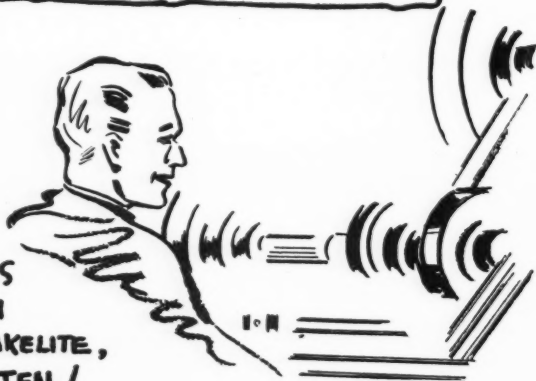


THIS IS THE TRADE MARK
OF THE ONLY STANDARD
EQUIPMENT LINE OF
CONTACT REPLACEMENTS
WITH PRICES LOW ENOUGH
TO MEET CHAIN-STORE
COMPETITION.

WE MAKE OUR OWN TOOLS
AND DIES, STAMP OUR OWN
PARTS, MOLD OUR OWN BAKELITE,
REFINE OUR OWN TUNGSTEN!



THE WORLD'S TOUGHEST METAL
IS A PLASTIC. MELTING ONLY
AT 6100°, IT CAN'T BE CAST.
IT IS MOLDED INTO SHAPE AS
A POWDER, THEN FUSED TOGETHER.



CONTACT OUR SALESMAN FOR THE INSIDE STORY OF TUNGSTEN!
TUNGSTEN CONTACT MFG. CO., Inc., North Bergen, N. J.

USED CARS

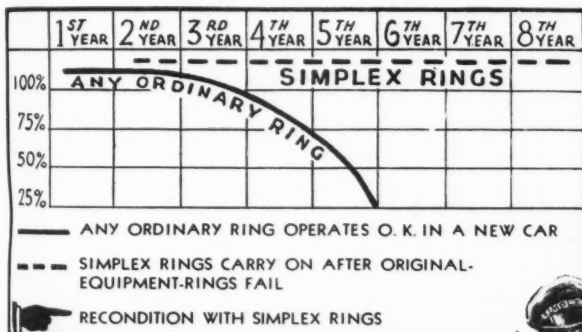
LICKS THE TOUGHEST JOBS!



NO OIL PUMPERS
HERE—THEY'RE
RECONDITIONED



the SIMPLEX WAY



Garagemen—take a tip from the nation's used-car dealers. These men have discovered that even the toughest reconditioning jobs can be easily licked by the use of Simplex laminated rings. They draw no model-lines now on trade-ins because they know that they can safely tack their used car guarantee on *any* car reconditioned the Simplex way. Simplex helps make solid the car dealers used-car guarantee.

Simplex rings are engineered: (1) to meet and beat any existing piston problem in both popular priced and high priced cars; (2) to keep reconditioning costs reasonable so that jobs will be easier to sell and reconditioned used-car prices may be kept attractive; (3) to simplify ring installation (all segments are alike as two peas in a pod)—no chance of error—no costly come-backs.

Remember—any ordinary ring ought to work well in a new car, but it takes a darned good ring to carry-on after the second year—that's Simplex.

Simplex sets the style and the pace in correct ring construction. Simplex was the first to see the need of multiple wiping edges in an expander type ring. Simplex is absolutely the only genuine 100% laminated, *softer-than-cylinder*, expander-type ring made. Its construction is protected by U. S. government patents. Phone your nearest Simplex Distributor—he specializes on Simplex Ring Motor Conditioning and guarantees results.

SIMPLEX PRODUCTS CORPORATION
 3838 Kelley Avenue - - - - - Cleveland, Ohio

46¢ LIST

VOLUME
PRICES
for
VOLUME
CARS



SIMPLEX

PISTON RINGS

Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-d. Sed. (Divd.)	Wheelbase (In.)	Tire Size (In.)	ENGINE																	CHASSIS						
					No. of Cylinders, Bore and Stroke	Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake HP. at Specified R.P.M.	Compression Ratio (to-1.)	Displacement Factor %	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Gearset Make	Universals Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension			
																				Type and Make								
1	Bantam..... 60	439	75	5.00/15	4-2.2x3.0	7.75	45.6	20-4000	7.00	.....	Al	Gear	Als	No	No	Til	Buf	AL	Wil	P.Ro	WG	Nb-UP	1/2 Spi	5.87 Tr			
2	Buick..... 38-40	1022	122	6.50/16	8-3 1/2 x 4 1/2	30.6	248.0	107-3400	6.15	39.2	CI	LB	Ala	No	AC	SM	Wal	DR	Del	P.Own	Own	m-Spi	1/2 Own	4.40 IC				
3	Buick..... 38-60	1272	126	7.00/15	8-3 1/2 x 4 1/2	37.8	320.2	141-3600	6.35	42.3	CI	LB	Ala	No	AC	SM	Wal	DR	Del	P.Own	Own	m-Spi	1/2 Own	3.90 IC				
4	Buick..... 38-80	1645	133	7.00/16	8-3 1/2 x 4 1/2	37.8	320.2	141-3600	6.35	39.3	CI	LB	Ala	No	AC	SM	Wal	DR	Del	P.Own	Own	m-Spi	1/2 Own	4.18 IC				
5	Buick..... 38-90	2176	140	7.50/16	8-3 1/2 x 4 1/2	37.8	320.2	141-3600	6.35	38.6	CI	LB	Ala	No	AC	SM	Wal	DR	Del	P.Own	Own	m-Spi	1/2 Own	4.55 IC				
6	Cadillac V8-38-60-60S	2085	127	7.00/16	8-3 1/2 x 4 1/2	39.2	346.0	135-3400	6.25	.....	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	1/2 Own	3.92 IC			
7	Cadillac..... V8-38-65	2285	132	7.50/16	8-3 1/2 x 4 1/2	39.2	346.0	135-3400	6.25	42.8	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	1/2 Own	4.58 IC				
8	Cadillac..... V8-38-75	3075	141	7.50/16	8-3 1/2 x 4 1/2	39.2	346.0	140-3400	6.70	39.7	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	1/2 Own	4.58 IC				
9	Cadillac-V-16..... 38-90	5135	141	7.50/16	16-3 1/2 x 3 3/4	67.6	431.0	185-3600	6.80	.....	CI	Mor	Ala	Fram	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	1/2 Own	4.31 IC			
10	Chevrolet HB Master	730	112 1/4	6.00/16	6-3 1/2 x 3 3/4	29.4	216.5	85-3200	6.25	35.7	CI	Own	Own	CI	No	AC	Car	Own	DR	D	P.Own	Own	m-Own	1/2 Own	3.72 C			
11	Chevrolet..... HA DeL.	796	112 1/4	6.00/16	6-3 1/2 x 3 3/4	29.4	216.5	85-3200	6.25	39.7	CI	Own	Own	CI	No	AC	Car	Own	DR	D	P.Own	Own	m-Own	1/2 Own	4.22 IC			
12	Chrysler..... Roy. C-18	998	119	6.25/16	6-3 3/4 x 4 1/4	27.3	241.5	95-3600	6.20	39.3	CI°	Mor	Ala	Pur	BA	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	1/2 Own	4.10 IC				
13	Chrysler..... Imp. C-19	1198	125	6.50/16	8-3 1/4 x 4 1/4	33.8	298.6	110-3400	6.20	39.5	CI°	Mor	Ala	Pur	AC	Str	NS	AL	Wil	P.B&B	WG	Nb-UP	1/2 Own	3.91 IC				
14	Chrysler Cus.Im.C-20	2295	144	7.50/16	8-3 1/4 x 4 1/4	33.8	323.5	130-3400	6.50	.....	AI	Mor	Ala	Pur	AC	Str	NS	AL	Wil	P.B&B	WG	Nb-UP	1/2 Own	4.55 IC			
15	De Soto..... S-5	958	119	6.00/16	6-3 3/4 x 4 1/4	27.3	228.1	93-3600	6.50	37.8	CI°	Mor	Ala	Pur	AC	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	1/2 Own	4.10 IC				
16	Dodge..... Six	898	115	6.00/16	6-3 1/4 x 4 3/8	25.3	217.8	87-3600	6.50	38.0	CI	Mor	Als	Pur	AC	Str	NS	AL	Wil	P.B&B	Own	Nb-UP	1/2 Own	4.10 C				
17	Ford..... V8-60	685	112	5.50/16	8-2.6x3.2	21.6	136.0	60-4200	6.60	30.0	AI	Gear	CS	No	Yes	Str	Own	O	Own	P.....	Own	m-Spi	3/4 Own	4.44 Tr				
18	Ford..... V8-85	710	112	6.00/16	8-3 1/4 x 3 3/4	30.0	221.0	85-3800	6.12	37.5	AI	Gear	CS	No	Yes	Str	Own	O	Own	P.Os	Own	m-Spi	3/4 Own	3.78 Tr				
19	Graham..... Std., Spec.	1025	120	6.25/16	6-3 1/4 x 4 3/8	25.3	217.8	90-3600	6.70	35.3	AI	LB	Als	No	Bur	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	1/2 Spi	4.27 C				
20	Graham S.C., Cus.S.C.	1198	120	6.25/16	6-3 1/4 x 4 3/8	25.3	217.8	116-4000	6.70	.....	AI	LB	Als	Fram	Bur	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	1/2 Spi	4.27 C			
21	Hudson 112..... 89	755	112	5.50/16	6-3x4 1/2	21.6	175.0	83-4000	6.50	.....	CI	GED	AI	No	Bur	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 C			
22	Hudson-Terrapl..... 81	864	117	6.00/16	6-3x5	21.6	212.0	96-3900	6.25	38.0	CI	GED	AI	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 C				
23	Hudson-Terrapl..... 82	915	117	6.00/16	6-3x5	21.6	212.0	101-4000	6.25	37.5	CI	GED	AI	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 C				
24	Hudson, 6..... 83	984	122	6.00/16	6-3x5	21.6	212.0	101-4000	6.25	36.7	CI	GED	AI	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 C				
25	Hudson 8, 84, 5, 7	1060	122, 129	6.50/16	8-3x4 1/2	28.8	254.5	122-4200	6.25	41.2	CI	GED	AI	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 C				
26	Hupmobile Six..... E	1045	122	6.25/16	6-3 1/2 x 4 1/4	29.4	245.3	101-3600	5.75	42.2	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.B&B	WG	Nb-Spi	1/2 Spi	4.54 C				
27	Hupmobile Eight..... H	1325	125	6.50/16	8-3 1/2 x 4 1/4	32.5	303.2	120-3600	5.80	44.5	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.Own	WG	Nb-UP	1/2 Spi	4.54 C				
28	La Salle..... V8, 38-50	1380	124	7.00/16	8-3 3/4 x 4 1/2	36.4	322.0	125-3400	6.25	40.7	CI	Mor	Ala	No	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	1/2 Own	3.92 IC				
29	Lincoln..... V12	(i) 136-145	125	7.50/17	12-3 1/2 x 4 1/2	46.8	414.0	150-3400	5.38	34.3	AI	Ch	AI	Pur	AC	Str	Own	AL	Exi	P.Long	Own	m-Spi	FF Tim	4.58 C				
30	Lincoln-Zephyr.....	1375	125	7.00/16	12-2 3/4 x 3 3/4	36.3	267.0	110-3900	6.70	40.8	AI	Gear	CS	Fram	CG	Own	O	Own	P.....	Own	m-Spi	3/4 Own	4.44 Tr					
31	Nash Lafay..... 3810	850	117	6.00/16	6-3 3/4 x 4 3/8	27.3	234.8	95-3400	5.83	38.4	CI	Whit	Als	No	AC	Str	Wal	AL	USL	P.B&B	Own	Nb-Mec	1/2 Own	4.11 C				
32	Nash Amb. 6, 3820	1050	121	6.25/16	6-3 3/4 x 4 3/8	27.3	234.8	105-3400	6.00	35.5	CI	Whit	Als	BS	AC	Mar	Wal	AL	USL	P.B&B	Own	Nb-Mec	1/2 Own	4.11 C				
33	Nash Amb. 8, 3880	1200	125	7.00/16	8-3 1/2 x 4 1/4	31.2	260.8	115-3400	6.00	35.0	CI	Dia	Als	BS	Bur	Str	Wal	AL	USL	P.B&B	Own	Nb-Mec	1/2 Own	4.10 C				
34	Oldsmobile..... F-38	967	117	6.50/16	6-3 1/2 x 4 1/4	28.4	229.7	95-3400	6.10	38.4	CI	Whit	Ala	No	AC	Car	Var	DR	D	P.B&B	Own	Nb-Mec	1/2 Own	4.37 IC				
35	Oldsmobile..... L-38	1078	124	7.00/16	8-3 1/2 x 3 3/4	33.8	257.1	110-3600	6.20	41.7	CI	LB	Ala	No	AC	Car	Var	DR	D	P.B&B	Own	Nb-Mec	1/2 Own	4.37 IC				
36	Packard Six..... 1600	1175	122	6.50/16	6-3 1/2 x 4 1/4	29.4	245.3	100-3600	6.52	40.0	CI	Mor	Als	Pur	AC	CG	Old	DR	Wil	P.Long	Own	Nb-Mec	1/2 Own	4.54 IC				
37	Packard Eight, 1601, 2	1325	127, 48	7.00/16	8-3 1/2 x 4 1/4	33.8	282.0	120-3800	6.60	41.4	AI	Mor	Als	Pur	AC	Str	Old	AL	PD	P.Long	Own	Nb-UP	1/2 Own	(b) IC				
38	Pack. Sup. 8, 1603, 4.5	2790	127-34-39	7.50/16	8-3 1/2 x 5	32.5	320.0	130-3200	6.50	40.0	AI	Mor	Als	Pur	AC	Str	Old	AL	PD	P.Long	Own	Nb-UP	1/2 Own	4.69 IC				
39	Pack. Twelve, 1607, 8	4155	134, 39	8.25/16	12-3 1/2 x 4 1/4	56.7	473.0	175-3200	6.40	45.3	AI	Mor	Als	Pur	AC	Str	Old	AL	PD	P.Long	Own	Nb-Spi	1/2 Own	4.41 IC				
40	Plymouth..... P5	730	112	5.50/16	6-3 1/2 x 4 3/8	23.4	201.3	82-3600	6.70	36.6	CI°	Mor	Ala	No	BA	BC	NS	AL	Wil	P.B&B	Own	Nb-UP	1/2 Own	3.90 C				
41	Plymouth..... P6	803	112	6.00/16	6-3 1/2 x 4 3/8	23.4	201.3	82-3600	6.70	36.2	CI°	Mor	Ala	Pur	BA	BC	NS	AL	Wil	P.B&B	Own	Nb-UP	1/2 Own	4.10 C				
42	Pontiac 6..... 38-26DA	916	117	6.00/16	6-3 1/2 x 4	28.3	222.7	85-3520	6.20	37.4	CI	Mor	CHI	No	AC	Car	BH	DR	Del	P.Own	Own	Nb-Mec	1/2 Own	4.37 IC				
43	Pontiac 8..... 38-28DA	980	122	6.50/16	8-3 1/2 x 3 3/4	33.8	248.9	100-3700	6.20	40.0	CI	Mor	CHI	No	AC	Car	Buf	DR	Del	P.Own	Own	Nb-Mec	1/2 Own	4.37 IC				
44	Stude. Six & Com.....	965	116 1/2	6.00/16	6-3 1/2 x 4 3/8	26.3	226.0	90-3400	6.00	41.2	CI	Dia	Ly	Fram	AC	Str	Buf	AL	Wil	P.B&B	WG	Ru-Th	1/2 Spi	4.55 IT				
45	Studebaker. Pres. 4C	1195	122	6.50/16	8-3 1/2 x 4 1/4	30.0	250.4	110-3600	6.00	41.6	CI	Dia	Ly	Fram	AC	Str	Buf	AL	Wil	P.Long	WG	Nb-Spi	1/2 Spi	4.55 IT				
46	Willys..... 38	573	100	5.50/16	4-3 1/2 x 4 3/8	15.6	134.2	48-3200	5.70	31.6	CI°	LB	CI	F-O	AC	Til	Buf	AL	USL	P.R-B	WG	m-UP	1/2 Own	4.30 C				

ABBREVIATIONS-General

0—Others also
 *—Measured on rim of Flywheel
 1/2—Semi-floating
 3/4—Three-quarter floating
 †—With clearance of .015 the valve is .001 off its seat.
 ‡—Does not include Federal Taxes
 §—Computed on basis of displacement, gear ratio, effective tire

diameter, and weight with normal load.
 (a)—(1/4 to 1/2)
 A—Above (rods removed from)
 A—After top center
 AA—Automatic adjuster
 Ad—Advanced
 Al—Aluminum
 Ala—Aluminum, Anode processed
 Als—Aluminum with struts
 Au—Automatic
 (b)—4.36-1601; 4.70-1602

B—Below (rods removed from)
 B—Before top center
 Bm—Before marks on vibration damper
 (c)—1-1/2, 1-3/4
 C—Conventional
 C—Cold (Tappet clearance)
 Ch—Chain
 CHI—Chrome Nickel Iron
 CI—Cast Iron CS—Cast Steel
 CSM—Chain sprocket markings
 (d)—0+0-1/2 (e)—0+1/2-0

(f)—1/2+1/2-0
 F—Floating (Piston Pin)
 FF—Full floating
 (g)—138 in.-7.00/17; 147 in.-7.50/17
 H—Hot (tappet clearance)
 (i)—4900-5100 IC—Independent coil
 IT—Independent Transverse
 (k)—Intake .0125; Exhaust .0156
 Ly—Lynite
 m—Metal
 M—Mechanical N—Negative
 (n)—Intake .0124; Exhaust .0156

Nb—Needle bearing
 P—Piston (Pin Locked in)
 P—Single plate clutch
 PH—Power operated, hydraulic brakes R—Rod (Pin locked in)
 RS—Radial Safety Control
 (r)—Out only Ru—Rubber
 TC—Top Center
 Tr—Transverse
 Var—Various
 x—At 1000 R.P.M.
 y—At 2800 R.P.M.

Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

Series, Make, Model and Type			RINGS				VALVES										IGNITION										FRONT AXLE						
			Spark Plug		No. and Width Comp.	No. and Width Oil	Piston Pin Diameter	Piston Pin Locked In	Head Diameter and Seat Angle			Operating Tappet Clearance		Intake Valve Opens Before or After T.C.		Timing		Breaker Housing	Rods Removed From	Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Qts.)	Capacity Cooling System (Qts.)	Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)	King Pin Inclination (Degrees)	Lin Number					
									Inlet (Ins.)	Inlet Seat Angle (Degrees)	Exhaust (Ins.)	Exhaust Seat Angle (Degrees)	Stem Diameter (Ins.)	Inlet	Exhaust														Inlet Tappet Clearance for Valve Timing	No. of Degrees	No. of Flywheel Teeth	Breaker Points Gap (Ins.)	Spark Plug Gap (Ins.)	Spark Occurs °TC	No. of Flyw. Teeth Spark Occurs TC
OM La	90	AL-A9	2-3/8	1-1/8	3/8	R	1-3/8	30	1-1/8	30	.279	.006	.006	.006	19B	4 1/4 B	.022	.025	2 1/4 B	1B	Au	A	1 1/8	1 1/4	1 1/2	7	5	1/2	0° 9'	1 1/2	1		
OH S	112	AC-46	2(c)	2-1/8	1 1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	††	13B	5 1/4 B	.015	.025	4B	1 1/2 B	Au	A	2	1.21	6 13/4	N 1/2	-1/4, +1	0-1/8	3 1/4-4 1/4	2	2		
OH S	114	AC-46	2(c)	2-1/8	1 1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	††	14B	6B	.015	.025	6B	2 1/2 B	Au	A	2 1/4	1.31	8 17	N 1/2	-1/4, +1	0-1/8	3 3/4-4 1/4	3	3		
OH S	114	AC-46	2(c)	2-1/8	1 1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	††	14B	6B	.015	.025	6B	2 1/2 B	Au	A	2 1/4	1.31	8 17	N 1/2	-1/4, +1	0-1/8	4-5	4	5		
OH S	114	AC-46	2(c)	2-1/8	1 1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	††	14B	6B	.015	.025	6B	2 1/2 B	Au	A	2 1/4	1.31	8 17	N 1/2	-1/4, +1	0-1/8	4-5	5	5		
BH S	155	AC-45	2-1/8	2-1/8	7/8	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4 B	Au	A	2.46	2 1/2	7 24	N 3/4-0	1/4-1	0-1/2	4° 51'	6	6		
BH S	155	AC-45	2-1/8	2-1/8	7/8	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4 B	Au	A	2.46	2 1/2	7 25	0-1/4	0-1/2	5° 38'	7	7			
BH S	170	AC-45	2-1/8	2-1/8	7/8	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4 B	Au	A	2.46	2 1/2	7 25	0-1/4	0-1/2	5° 38'	8	8			
BH S	180	AC-45	2(c)	1-1/8	1 1/8	R	1.50	45	1.37	45	.341	AA	AA	AA	8B	3 1/2 B	.015	.027	6B	2 1/2 B	Au	A	2	1 1/4	11 30	0-1/4	0-1/2	5° 38'	9	9			
OH O	AC-46	2-1/8	1-1/8	8/8	R	1 1/8	30	1 1/8	30	.340	.006H	.013H	.006	9B	3 1/2 B	.021	.040	5B	2S	Au	A	2 1/8	1 1/2	5 14	1 1/4-2 1/4	1/2-1 1/2	7° 10'	10	10				
OH O	AC-46	2-1/8	1-1/8	8/8	R	1 1/8	30	1 1/8	30	.340	.006H	.013H	.006	9B	3 1/2 B	.021	.040	5B	2B	Au	A	2 1/8	1 1/2	5 14	1 1/4-2 1/4	1/2-1 1/2	7° 10'	11	11				
LH G	145x	AL-A7	2-1/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.340	.008H	.010H	.014	8B	3 1/4 B	.020	.025	TC	TC	Au	A	2 1/8	1 1/2	5 20	1/2-2 1/2	(a)	0-1/8	4 1/2-6	12	12		
LH G	145x	AL-A7	2-1/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.340	.008H	.010H	.011	2B	3 1/4 B	.018	.025	3B	1 1/4 B	Au	A	2 1/8	1 1/2	6 20	1/2-2 1/2	(a)	0-1/8	4 1/2-6	13	13		
LH G	145x	AL-A7	2-1/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.340	.006H	.010H	.011	2B	3 1/4 B	.018	.025	TC	TC	Au	A	2 1/8	1 1/2	6 20	1-3	(a)	0-1/8	4 1/2-6	14	14		
LH G	145x	AL-A7	2-1/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.340	.008H	.010H	.014	8B	3 1/4 B	.020	.025	TC	TC	Au	A	2 1/8	1 1/2	5 20	1/2-2 1/2	(a)	0-1/8	4 1/2-6	15	15		
LH O	140x	AL-A7	2-1/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.340	.006H	.008H	.011	6A	2 1/2 A	.020	.025	4A	1 1/2 A	Au	A	2 1/8	1	5 15	1-3	1/4-3/4	0-1/8	4 1/2-5 1/2	16	16		
OM O	150y	Ch-H-10	2-3/8	1-3/8	3/4	F	1.28	45	1.28	45	.279	.013C	.013C	.013	9 1/2 B	3B	.015	.025	4B	1 1/2 B	Au	A	1.60	1.54	4 15.2	8	1	1/8-1/8	8	17	17		
OM O	100	Ch-7	2-3/8	1-3/8	3/4	F	1.28	45	1.28	45	.310	.013C	.013C	.013	9 1/2 B	3B	.015	.025	4B	1 1/2 B	Au	A	2	1 1/2	5 22	8	1	1/8-1/8	8	18	18		
OH R	160x	Ch-J-9	2-3/8	1-3/8	3/4	R	1 1/8	30	1 1/8	45	1/8	.010H	.010H	.012	4 1/2 B	1 1/2 B	.018	.025	4B	1 1/2 B	Au	A	2 1/8	1 1/8	5 15	3-4	1	1/8-1/8	7 1/2	19	19		
OH R	120	Ch-J-9	2-3/8	1-3/8	3/4	R	1 1/8	30	1 1/8	45	1/8	.010H	.010H	.012	4 1/2 B	1 1/2 B	.018	.025	4B	1 1/2 B	Au	A	2 1/8	1 1/8	5 15 1/2	3-4	1	1/8-1/8	7 1/2	20	20		
HMG	115	Ch-J-8-A	2-3/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.006	.008	.008	.010	10 1/2 B	4B	.020	.032	TC	TC	Au	A	1 1/8	1 1/8	4 12 1/2	2-3	1-1 1/2	0-1/8	7	21	21		
HMG	120	Ch-J-8-A	2-3/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.006	.008	.008	.010	10 1/2 B	4B	.020	.032	TC	TC	Au	A	1 1/8	1 1/8	4 12 1/2	2-3	1-1 1/2	0-1/8	7	22	22		
HMG	120	Ch-J-8-A	2-3/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.006	.008	.008	.010	10 1/2 B	4B	.020	.032	TC	TC	Au	A	1 1/8	1 1/8	4 12 1/2	2-3	1-1 1/2	0-1/8	7	23	23		
HMG	120	Ch-J-8-A	2-3/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.006	.008	.008	.010	10 1/2 B	4B	.020	.032	TC	TC	Au	A	1 1/8	1 1/8	4 12 1/2	2-3	1-1 1/2	0-1/8	7	24	24		
HMG	118	Ch-J-8-A	2-3/8	2-3/8	3/4	F	1 1/2	45	1 1/8	45	.006	.008	.008	.010	10 1/2 B	4B	.017	.032	TC	TC	Au	A	1 1/8	1 1/8	7 17 1/2	2-3	1-1 1/2	0-1/8	7	25	25		
H G	Ch-7	2-1/8	2-3/8	7/8	1 1/8	F	1 1/8	45	1 1/8	45	.341	.010	.013	.010	2B	3 1/8	.022	.027	7B	2 1/2 B	Au	A	2 1/8	1 1/4	6 18	1 1/2	1	1/8-1/8	8 1/2	26	26		
H G	Ch-7	2-1/8	2-3/8	7/8	1 1/8	F	1 1/8	45	1 1/8	45	.341	.006	.013	.010	1A	3 1/8	.015	.027	7B	2 1/2 B	Au	B	2 1/8	1 1/4	8 21.5	1 1/2	1 1/4	1/8-1/8	7 1/2	27	27		
BH S	155x	AC-45	2-1/8	2-3/8	7/8	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4 B	Au	A	2 1/2	2 1/2	7 25	N 3/4-0	1/4-1	0-1/2	4° 51'	28	28		
OM O	105	Ch-7	2-1/8	2-3/8	7/8	F	1 1/8	45	1 1/8	45	1/8	AA	AA	AA	21B	6 1/4 B	.020	.029	7B	2 1/4 B	Au	B	2 1/2	2	12 32	1 1/2	1	1/8-1/8	7 1/2	29	29		
OM O	105	Ch-H-10	2-1/8	2-3/8	7/8	F	1.54	45	1.54	45	.311	AA	AA	AA	19B	6B	.015	.029	4B	1 1/4 B	Au	B	2 1/2	1.57	5 30	4	1 3/4	0-1/8	7 1/2	30	30		
BH G	110	AL-B7	2-1/8	2-3/8	7/8	F	1 1/8	45	1 1/8	45	.340	.015	.015	.015	CSM	CSM	.020	.025	4A	2 1/2 B	Au	A	2	1.42	6 20	1-2	0-1 1/2	0-1/8	7	31	31		
BH G	125	AC-45	2-1/8	2-3/8	7/8	F	1 1/8	45	1 1/8	45	.372	.008H	.015H	.008	CSM	CSM	.020	.025	4A	1 1/2 B	Au	A	2	1.42	7 20	1-2	0-1 1/2	0-1/8	7	32	32		
BH G	125	AC-45	2-1/8	2-3/8	7/8	F	1 1/8	45	1 1/8	45	.375	.015H	.015H	.008	CSM	CSM	.020	.025	9B	2 1/2 B	Au	B	2	1.24	7 18	1-2	0-1 1/2	0-1/8	7	33	33		
BH S	146x	AC-45	2-1/8	2-1/8	7/8	P	1 1/8	30	1 1/8	45	.008H	.011H	(k)	5B	2B	.020	.040	TC	TC	Au	A	2 1/8	1 1/8	6 17	0-N 3/4	1/2-1	1/8-1/8	4° 51'	34	34			
BH S	152x	AC-45	2-1/8	2-1/8	7/8	P	1 1/8	30	1 1/8	45	.008H	.011H	(n)	TC	TC	.015	.030	2B	3 1/4 B	Au	A	2 1/8	1 1/8	7 21	0-N 3/4	1/2-1	1/8-1/8	4° 51'	35	35			
H O	110	AC-103	(z)	2-1/8	1-3/8	7/8	F	1.57	30	1 1/8	45	.340	.007H	.010H	1B	1 1/2 B	.020	.028	6B	3 1/2 B	Au	A	2 1/8	1 1/4	6 15	1 1/2-1 1/2	1/2-1/2	(e)	1° 54'	36	36		
H O	110	AC-103	(z)	2-1/8	1-3/8	7/8	F	1 1/8	30	1 1/8	45	.340	.007H	.010H	1B	1 1/2 B	.015	.028	8B	2 1/2 B	Au	A	2 1/8	1 1/4	6 16	1 1/2-1 1/2	1/2-1/2	(e)	1° 54'	37	37		
H O	110	AC-103	(z)	2-1/8	1-3/8	7/8	F	1 1/8	45	1 1/8	45	.340	.006H	.008H	1B	1 1/2 B	.015	.028	6B	2 1/2 B	Au	B	2	1 1/8	8 20	2 1/2-1 1/2	1-1 1/4	(f)	1 1/2	38	38		
BPH O	110	AC-103	(z)	3-3/8	1-3/8	1 1/8	F	1 1/8	45	1 1/8	45	.340	AA	AA	30B	TC	.020	.028	6B	2B	Au	B	2 1/8	1 1/8	10 40	(d)	1-1 1/4	(f)	1 1/2	39	39		
LH O	145x	Ch-J-8	2-1/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.340	.006H	.008H	.011	6A	2 1/4 A	.020	.025	4A	1 1/2 A	Au	A	1 1/8	1	5 14	3-5	1/4-3/4	0-1/8	4 1/2-5 1/2	40	40		
LH O	145x	AL-A7	2-1/8	2-3/8	3/4	F	1 1/8	45	1 1/8	45	.340	.006H	.008H	.011	6A	2 1/4 A	.020	.025	4A	1 1/2 A	Au	A	1 1/8	1	5 14	1-3	1/4-3/4	0-1/8	4 1/2-5 1/2	41	41		
HMS	141x	AC-45	2-1/8	1-1/8	3/8	P	1 1/8	30	1 1/8	45	.310	.012H	.012H	.015	5B	2B	.020	.025	2B	3 1/2 B	Au	A	2	1 1/8	6 16	N 1/2-N 1/2	3/4-1 1/4	0-1/8	4° 51'	42	42		
HMS	141x	AC-45	2-1/8	1-1/8	3/8	P	1 1/8	30	1 1/8	45	.310	.012H	.012H	.015	5B	2B	.015	.025	2B	3 1/2 B	Au	A	2	1 1/8	7 19	N 1/2-N 1/2	3/4-1 1/4	0-1/8	4° 51'	43	43		
LH R	105	Ch-8-A	2-1/8	1-1/8	7/8	R	1 1/8	45	1 1/8	45	.016C	.016C	.020	15B	5 1/2 B	.020	.025	2B	TC	Au	A	2 1/8	1 1/8	8 17	45'	1/2	1/8-1/8	5 1/2	44	44			
LH R	105	Ch-8-A	2-1/8	1-1/8	7/8	R	1 1/8	45	1 1/8	45	.016C	.016C	.020	15B	5 1/2 B	.020	.025	TC	TC	Au													

MAKES OF UNITS

AC—AC Spark Plug Co.
AL—Auto-Lite
BC—Carter and Chandler-Groves
BA—Burgess or AC
B&B—Borg and Beck
BH—Buffalo or Hayes (mufflers)
BH—Bendix, Hydraulic
BM—Bendix, Mechanical
BO—Buffalo or Oldberg

BPH—Bendix, power operated, hydraulic
BS—Briggs & Stratton
BuF—Buffalo Pressed Steel
Bur—Burgess **Car**—Carter
CG—Chandler-Groves
Ch—Champion
Del—Delco
Dia—Continental Diamond Fiber
Det—Detroit **Exl**—Exide
DR—Delco-Remy

F-O—Float-O **G**—Gemmer
Ge—General Electric Co.
GED—General Electric or Continental Diamond Fibre
HM—Bendix hydraulic and mechanical combined
LB—Link Belt
LH—Lockheed hydraulic
Mar—Marvel **Mec**—Mechanics
Mor—Morse Chain Co.
Nat—National

NS—Noblitt Sparks
O—Own
OH—Own hydraulic
Old—Oldberg
OM—Own, mechanical
OP—Own, power operated
Os—Own, semi-centrifugal
PD—Prest-O-Lite or Delco
Pur—Purulator **R**—Ross
R-B—Rockford with Borg &
 Beck disk **R**—Rockford

S—Saginaw
SC—Stromberg or Carter
SM—Stromberg or Marvel
Spi—Spicer Ste—Stewart-Warner
Str—Stromberg
Th—Thompson Products
UP—Universal Products
Wal—Walker
WG—Warner Gear
White—Whitney Wil—Willard
(z)—Or Champion Y—4

Truck Tune-Up Specifications

MO⁺†—6 Wheel Equipment

Truck Tune-Up Specifications

MOTOR AGE, June, 1938

TRUCK MAKE AND MODEL	Engine Make and Model	Number of Cylinders Bore and Stroke	Connecting Rods Removed From	Intake Valve Opens "TC" B—Before A—After	Operating Tappet Clearance		Spark Plug Gap	Breaker Point Gap	Spark Occurs "TC" B—Before A—After	Compression Pressure at Cranking Speed
					Intake	Exhaust				
AUTOCAR A, UA B, UB RM, RMT D, DP, 1TR, 1UTR, RL, RLD, RLS, UD, UDP, 6X2RL, 6X2UD D, DH, N, NFS, 2TR, UDF, UN, UNFS, 2UTR, 4X4DF, 4X4N, 6X2DF, 6X4DF, 6X2UN NF, CE, TS, 3TR, 4TR, S, UNF, UTS, 3UTR, 4UTR, US, 4X4NF, 6X2NF, 6X2UNF T, 5TR, C, UT, 5UTR, 4X4S, 6X2T, 6X4TO, 6X4TD, 6X4TC, 6X2UT, 6X4UTO, 6X4UTD	Her JXB	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.021	.020	TC	95
	Her JXC	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.021	.020	TC	95
	Own 315	6-3 1/2x4 1/2	Top 2"A	.020	.015	.018	.021	.021	8 1/2"B	98
	Own 358	6-4x4 1/2	Top TC	.020	.015	.018	.021	.021	8 1/2"B	98
	Own 404	6-4 1/2x4 3/4	Top TC	.020	.015	.018	.021	.020	2"B	95
	Own 453	6-4 1/2x4 3/4	Top TC	.020	.015	.018	.021	.020	2"B	95
	Own 501	6-4 1/2x4 3/4	Top TC	.020	.015	.018	.021	.020	2"B	95
	Own 501	6-4 1/2x4 3/4	Top 19"B	.020	.015	.018	.021	.020	2"B	95
	Own 501	6-4 1/2x4 3/4	Top 19"B	.020	.015	.018	.021	.020	2"B	95
	Own 501	6-4 1/2x4 3/4	Top 19"B	.020	.015	.018	.021	.020	2"B	95
BANTAM BROCKWAY 94 96, 110, 130 125X, 145 150X, 160X, 160X, 165X 170X, 195X 175X, 220X 240X, 260X 112, 128	Con 258	6-3 1/2x4 3/4	Bot 5"B	.012	.008	.010	.025	.020	5"B	95
	Con 298	6-3 1/2x4 3/4	Bot 5"B	.015	.012	.012	.025	.020	5"B	95
	Con 318	6-3 1/2x4 3/4	Bot 5"B	.015	.012	.012	.025	.020	5"B	95
	Con 328	6-4 1/2x4 3/4	Bot 5"B	.015	.012	.012	.025	.020	5"B	95
	Con 338	6-4 1/2x4 3/4	Bot 5"B	.015	.012	.012	.025	.020	5"B	95
	Con 348	6-4 1/2x4 3/4	Bot 5"B	.015	.012	.012	.025	.020	5"B	95
	Con 358	6-4 1/2x4 3/4	Bot 5"B	.015	.012	.012	.025	.020	5"B	95
	Con 388	6-3 1/2x4 3/4	Bot 5"B	.015	.012	.012	.025	.020	5"B	95
	Own	6-3 1/2x4 3/4	Top 9"B	.008	.013	.013	.040	.018	5"B	90
	Own	6-3 1/2x4 3/4	Top 5"A	.008	.008	.008	.027	.020	TC	122
CHEVROLET HC, HD, HE, HE, TA, TB DIAMOND T 80 301, 304 401, 402, 404, 405, 212-AS, 212-BS 221-S, 406, 507, 508, 244-S, 313, 611 320, 353, 607, 613 360, 609, 612, 614 412-DR, 512-B, 512-DR	Her OXB3	6-3 1/2x4 1/2	Top 5"A	.008	.008	.008	.027	.020	TC	122
	Her OXC3	6-3 1/2x4 1/2	Top 5"A	.008	.008	.008	.027	.020	TC	122
	Her JXA	6-3 1/2x4 1/2	Top 5"A	.008	.008	.008	.027	.020	TC	121
	Her JXB	6-3 1/2x4 1/2	Top 5"A	.008	.008	.008	.027	.020	TC	121
	Her JXC	6-3 1/2x4 1/2	Top 5"A	.008	.008	.008	.027	.020	TC	115
	Her JXD	6-3 1/2x4 1/2	Top 5"A	.008	.008	.008	.027	.020	TC	115
	Her WXL3	6-4 1/2x4 3/4	Top 2"A	.010	.008	.010	.027	.020	TC	103
	Own 218 cu. in.	6-3 1/2x4 1/2	Top TC	.014	.008	.012	.025	.020	TC	103
	Own 218 cu. in.	6-3 1/2x4 1/2	Top TC	.014	.008	.012	.025	.020	4"B	103
	Own 241 cu. in.	6-3 1/2x4 1/2	Top TC	.014	.008	.012	.025	.020	6"B	103
DODGE RC, RD RE RG, RH RL, RK, RO, RP FEDERAL 9 10 11, 11H, 75, 75H 15, 15H, 20, 20H, 80, 80H 18, 18H, 20, 20H, 80, 80H 25, 25H, 85, 85H 28, 28H, 88, 88H 40, 40DR 50, 50H 50, 50H C7, C7W, C8, C8W, C8H	Own 218 cu. in.	6-3 1/2x4 1/2	Top TC	.014	.008	.012	.025	.020	TC	103
	Own 218 cu. in.	6-3 1/2x4 1/2	Top TC	.014	.008	.012	.025	.020	4"B	103
	Own 241 cu. in.	6-3 1/2x4 1/2	Top TC	.014	.008	.012	.025	.020	6"B	103
	Own 333 cu. in.	6-3 1/2x4 1/2	Top 6"A	.011	.008	.012	.025	.020	6"B	103
	Con F4140	4-3 1/2x4 1/2	Top TC	.008	.008	.008	.027	.020	TC	103
	Her OOB	6-3 1/2x4 1/2	Top 5"A	.008	.003	.012	.020	.020	TC	103
	Her OXB3	6-3 1/2x4 1/2	Top 5"A	.008	.003	.012	.020	.020	TC	103
	Her JXA	6-3 1/2x4 1/2	Top 5"A	.008	.003	.012	.020	.020	TC	103
	Her JXB	6-3 1/2x4 1/2	Top 5"A	.008	.003	.012	.020	.020	TC	103
	Her JXC	6-3 1/2x4 1/2	Top 5"A	.008	.003	.012	.020	.020	TC	103
FORD 81C, 81Y, 81T, 81TT 82C, 82Y GENERAL MOTORS T14, T15, T14S, T15S T16, T16H, F16, F16H T18, T18H, F18, F18H T23, T23H, F23, F23H T33, T33H, F33, F33H T46, F46 T61, T61H, F61, F61H HUDSON-TERRAPLANE 80, 88	Wau 6MK	6-4 1/2x4 3/4	Top 8"A	.004	.010	.012	.025	.020	TC	80
	Wau 6MZ	6-4 1/2x4 3/4	Top 8"A	.004	.010	.012	.025	.020	TC	80
	Wau 6SRK	6-4 1/2x4 3/4	Top 8"A	.004	.010	.012	.025	.020	TC	80
	Own	8-3 1/2x3 1/2	Top TC	.013	.013C	.013C	.025	.015	4"B	100
	Own	8-2 1/2x3 1/2	Top 9 1/2"B	.013	.013C	.013C	.025	.015	4"B	105
	Own 223	6-3 1/2x4 1/2	Top 5"B	.013	.012	.012	.030	.021	5"B	105
	Own 230	6-3 1/2x4 1/2	Top 5"B	.013	.012	.012	.030	.021	5"B	105
	Own 257	6-3 1/2x4 1/2	Top 4"B	.012	.013	.013	.035	.021	15"B	105
	Own 286	6-3 1/2x4 1/2	Top 4"B	.012	.013	.013	.035	.021	15"B	105
	Own 331	6-3 1/2x4 1/2	Top 18"A	.012	.013	.013	.035	.020	15"B	105
HERCULES H—Hot H—Continental Wau—Waukegan Wau—Waukegan	Her JXB	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103
	Her JXC	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103
	Her JXD	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103
	Her JXE	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103
	Her JXF	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103
	Her JXG	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103
	Her JXH	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103
	Her JXI	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103
	Her JXJ	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103
	Her JXK	6-3 1/2x4 1/2	Top 2"A	.010	.006	.006	.032	.020	TC	103

New York Auto Show Plans Under Way

Invitations to exhibit and application forms for space have just been issued for the 1938 National Automobile Show to be held in Grand Central Palace, New York. The show will open Armistice Day (Friday, Nov. 11) and close Friday, Nov. 18. It will occupy four floors of the Palace, divided as follows: Main and second floors: models of passenger cars, domestic and foreign; third floor: light trucks, Diesel power section; parts, accessories, and shop equipment; fourth floor: accessories,

trailers, educational and safety features.

Because of the growing interest in all forms of Diesel power the committee will provide a special section for both mobile and stationary Diesel engines and their accessories.

1938 Auto Show Schedule

(Dates as declared to Apr. 15th, 1938)

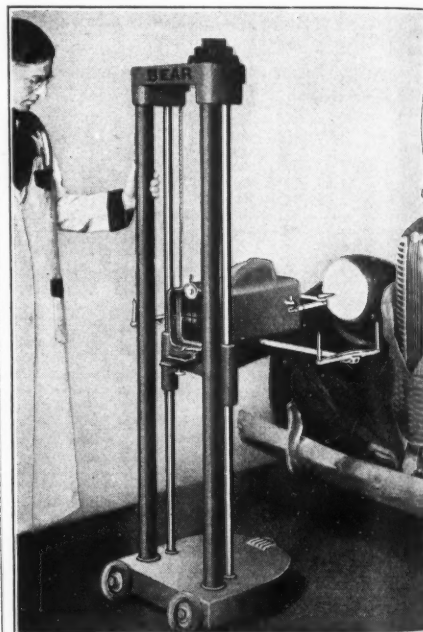
City	Dates
N. Y. Nat'l Truck Show	Nov. 9-15
New York (A.M.A.)	Nov. 11-18
Pittsburgh, Pa.	Nov. 11-18
Detroit, Mich.	Nov. 11-19
Columbus, O.	Nov. 12-18
Buffalo, N. Y.	Nov. 12-19

Chicago, Ill.	Nov. 12-19
Milwaukee, Wis.	Nov. 12-19
Minneapolis, Minn.	Nov. 12-19
Philadelphia, Pa.	Nov. 12-19
San Francisco, Cal.	Nov. 12-19
Los Angeles, Cal.	Nov. 12-20
Elmira, N. Y.	Nov. 14-19
New Haven, Conn.	Nov. 14-19
Baltimore, Md.	Nov. 19-26
Washington, D. C.	Nov. 19-26
Cincinnati, O.	Nov. 20-26
St. Louis, Mo.	Nov. 20-27
Newark, N. J.	Nov. 26-Dec. 3
Denver, Colo.	Dec. 5-10

Bear Has New Headlight Tester

A new headlight tester which meets all the standards established by legal regulation, has just been announced by the Bear Mfg. Co., Rock Island, Ill.

The new instrument tests the lateral aim as well as the elevation of the headlight beam by reproducing the exact pattern on a unique screen. By means of this screen and a spe-



cially ground lens, the focus and beam are checked in both inches and degrees. Light output and light intensity are measured by means of a photo-electric cell. The tester is made in two models, portable and stationary types, and is adjustable for any height from spot light to fog light.

Write the manufacturer for complete details.

Thermoid's New Brake Lining Sets

Thermoid Rubber Co., Trenton, N. J., has made another forward step in helping the brake man to turn out more brake service jobs more easily. Accurately drilled and countersunk Thermoid Custom-Built Brake Lining Sets are now available for the seven most popular passenger cars: Buick, Chevrolet, Dodge, Ford, Plymouth, Pontiac and Oldsmobile.

These sets are accurately drilled to factory specifications, and save time and trouble.

Yesterday's "Pioneer" STILL LEADS!



SIX years ago we introduced an "improved formula" brake fluid that corrected the evils of the so-called "standard" brands of that time.

We practically eliminated that arch-enemy of the Hydraulic system—"Corrosion." We raised the boiling point and lowered the freezing point. We produced a fluid that was chemically stable. And lastly, we gave it high lubricating efficiency.

Since then we have modified our formula from time to time, where laboratory tests showed that even further improvements were possible. EIS Brake Fluid, pioneer of better fluids, *still leads*—and today is the best money can buy!

EIS Brake Fluid is the original
NON-CORROSIVE FLUID

It preserves rubber and protects metal because it
CONTAINS NO WATER OR ACID

It does not change under heat or pressure because it is
CHEMICALLY STABLE

It is more economical because of its
HIGH VISCOSITY—HIGH BOILING POINT

It can be used in sub-zero climates because of its
LOW FREEZING POINT

It lubricates better because of its
GREATER OIL CONTENT

EIS Brake Fluid will absolutely mix with all fluids that car and truck manufacturers use and recommend.

"For a better refill job get EIS on the job!"

Write today for new lower price schedule

EIS MANUFACTURING CO., INC.

1365 Jerome Avenue, New York

REPAIR SHOP ADVENTURES OF CORKY



Corky helps a honey . . . save herself some money

CAN'T AFFORD IT?
I THOUGHT IT WAS
A GRADUATION
PRESENT FROM
YOUR DAD!

YES, BUT I HAVE TO KEEP
IT UP ON MY ALLOWANCE
AND IT USES SO MUCH OIL
I DON'T KNOW WHAT TO DO!

IT SEEMS TO ME YOUR
GARAGE-MAN OUGHT TO
HAVE FIXED THAT.

IDEA

..AND YOU BETTER SWITCH
HER TO ARMSTRONG-VICTOR
CORK GASKETS BEFORE
YOU LOSE A CUSTOMER!

THANKS FOR THE TIP, CORKY

KELLY'S
GARAGE

MISS WATSON, IT'S
LEAKY GASKETS
THAT USE UP OIL.
BUT IT WON'T LEAK
A DROP NOW.
I'VE GIVEN YOU
ARMSTRONG-VICTOR
CORK GASKETS.

LATER

THANKS, MR. KELLY, NOW
WE'LL BE ABLE TO TAKE
THAT VACATION TRIP
WE'VE BEEN PLANNING.

Take a tip from Kelly. Keep customers satisfied and you'll keep your cash register ringing. Use Armstrong-Victor Cork Gaskets and you can *guarantee* satisfaction. Live, high-grade cork is a natural seal against oil and water. It fills up irregularities in pitted and off-true surfaces. It has plenty of spring and comeback under pressure. Armstrong-Victor Cork Gaskets *always* fit . . . and the bolt holes *always* line up.

Our new Gasket List No. 27 makes it easy to select and order cork gaskets. Ask your Victor jobber for a copy. Or write to Victor Mfg. & Gasket Co., P. O. Box 1333, Chicago, Illinois.

Armstrong-Victor



CORK GASKETS
AND
HEADLAMP CORK

Reports Indicate Ford May Produce Light Tractor

Recurring newspaper reports indicate that Ford plans early production of a light-weight, low-cost farm tractor. Official confirmation of these reports has been lacking, however, indicating that the tractor may be one of Ford's personal interests, as the only things that have been announced are what Ford himself has said to newspaper men in occasional interviews.

Reported as being convinced that a back-to-the-farm movement would precede a new era of prosperity in

the United States, Ford was quoted as saying: "Cheap tractors and low-cost farm implements are a great need in this connection. We have been testing two tractors, and they perform to my entire satisfaction. We will begin production as quickly as we can. They will be light, powerful and efficient; designed to do almost everything on the farm."

Crosley Radio Is Safety-Tuned

A new automobile radio has been announced by The Crosley Radio Corp., Cincinnati, Ohio. It is a 5-tube set

and incorporates push-button tuning. Developed during the past year by Crosley engineers, this feature adds the safety of push-button tuning to



an automobile radio selling for as little as \$24.95. There are five push-buttons, and these can be set in less than a minute without removing any parts—all that is needed is a screw driver. The tuning action is mechanical and does not depend on motor drive or trimmer condensers for accuracy. The station to which the receiver is tuned is indicated by a pointer on the horizontal dial as well as by the push-button. The set can be tuned either by means of the push-button or dial knobs.

Torque Wrench Has No Springs

A new torque wrench designed without springs, small gears or other mechanism has been announced by the Miniature Train & Railroad Co., Glen Ellyn, Ill. It is constructed of carefully ground steel, the deflection of which registers in foot pounds of



torque on a heavy plate dial riveted to the handle. The pointer is electrically welded to the head of the wrench, the other end registering on the dial, the deflection of the measuring beam being clearly registered under the stationary pointer. List price \$9.75.



"Sorry, Mr. Burbank, only one to a customer."

**WANTUM RINGS MAKE MOTORS HUM?
YOU WATCH WAUSAU GIVUM SOME!**



"Wausau's fifteen years' in the ring business," says Little Chief, "assures you that performance is built into WAUSAU PISTON RINGS." They do a better job in re-conditioned motors -- are easier to install -- pep up performance--cut oil consumption! Prove it to yourself! Ask your jobber for WAUSAU RINGS, or write Wausau Motor Parts Co., manufacturers, Wausau, Wis. today!

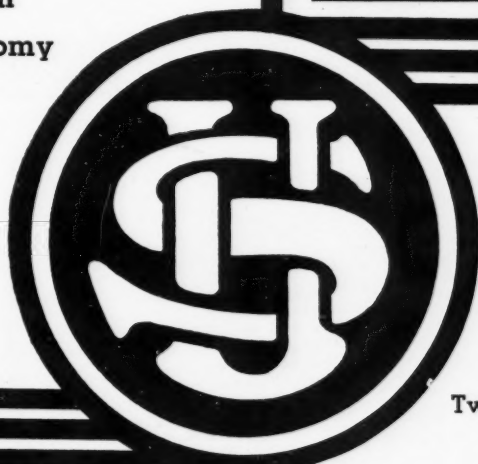
WAUSAU MOTOR PARTS COMPANY WAUSAU, WISCONSIN

For the BEST Motor Rebuilding Jobs

YOU NEED THE BEST EQUIPMENT

U. S. REFACERS EXCEL

- ... in efficiency
- ... in convenience
- ... in rugged strength
- ... in practical economy
- ... in lowest prices



U. S. REFACER

TYPE VR-6

Two sizes: 1/16" to 9/16"
1/8" to 5/8"

New streamline design. Heavy vibration-proof base. 1/4 h.p. motor. Refaces valves any angle from 30 to 60°. Ball bearing wheel spindle.

U. S. REFACER

TYPE VR-7

Three sizes: 1/8" to 5/8"
1/16" to 3/4"
1/4" to 1"

New heavy duty streamline design. Heavy vibration-proof base. Two motors: one for driving grinding wheel, one for driving chuck spindle. Refaces valves any angle from 15 to 90°.

WRITE for catalog and full details, or how to handle special problems.

THE UNITED STATES

CINCINNATI,

THE GOOD MECHANIC'S CHOICE

ELECTRICAL TOOL CO.

OHIO, U.S.A.

Pierce-Arrow Maintenance and Parts Firm Formed

A new firm called the 1685 Elmwood Ave. Corp. (location of the Pierce-Arrow plant in Buffalo) has been formed to take over the assets of the Pierce-Arrow Corp. and will continue maintenance and service parts operations. It is understood that a 10-day option has been granted to Walter E. Schott of Cincinnati to purchase this part of the business.

The new corporation filed the necessary papers, registered the firm's name in the county clerk's office in Buffalo, paid the \$40,000 asked price

and promptly took over the business.

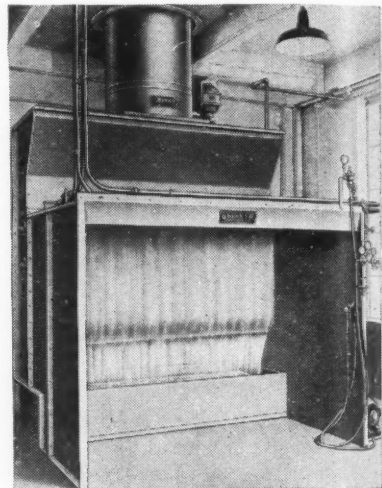
The \$40,000 represented the highest bid offered at the auction of the defunct motor car company. It was posted by William M. Emblidge, attorney for the Marine Trust Co. and the Federal Reserve Bank of New York, holders of liens totaling over \$1,300,000. Liens totaling \$78,200 are held by Mr. Schott against parts and inventories while city and county hold tax liens of \$140,000.

Spray Booth Equipment

The Dynaprecipitor, a radically new development which takes the place of the ordinary water-wash chamber for

spray booths, has just been announced by the Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill.

Using an entirely new principle in the cleaning of paint fumes, the new Binks Dynaprecipitor is said to reclaim all types of paints, synthetic



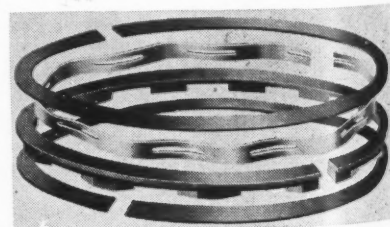
enamel, vitreous enamel, etc. It has no nozzles to clog or wear out, gives a very efficient elimination of paint pigments from spray fumes, and is very economical to operate. It is equipped with a special set of precipitator plates which are self cleaning. Another outstanding feature is the water curtain which extends the full width of the spray booth. For complete details and prices, write the manufacturer.

Steeloil Piston Ring

Added to Pedrick Line

The Wilkening Mfg. Co., Philadelphia, has added to its line of piston rings the Pedrick Auto-Service Steeloil ring. This ring has two steel segments separated by a cast-iron spacer. A slotted steel inner ring or expander completes the assembly. The new ring will be sold at the same prices as the regular Pedrick oil ring, a list of 49 cents in diameters up to 4 in.

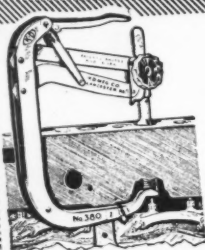
The installation recommendation is to use the Steeloil ring in the third groove of all three-ring and four-ring



pistons, and in the fourth groove of all five-ring pistons.

The Steeloil design is put on the market to provide a ring for use where oil control immediately in badly worn engines is more important to the car owner than long-life, all-around efficiency, top power and high gas mileage.

For all-around performance, no matter what the engine condition, for the longest period of service, Pedrick continues to recommend its hydraulic rings.



380 a good Compressor in any shop

Fast, strong, dependable, will service nearly all motors made. The best all-round Compressor for general shop use. Hand wheel automatically sets adjustment for each motor and over-center lock on handle leaves both hands free to handle keepers. Jaws tempered in oil and adjustable . . . two sets furnished, straight and offset.

List Price . . . only \$8.10



5B TOOL KIT

Small tools of special design for hard-to-get-at jobs around ignition, radio, carburetor, dash, etc. Three screwdrivers, two pliers, special alloy steel, hardened to stand the gaff. Each 4 1/4" long. Pocket-size fabrikoid case. Makes ideal gift or prize.

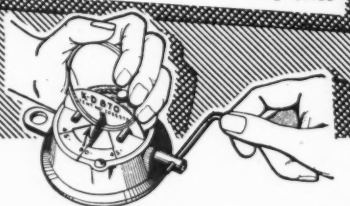
List Price . . . only \$1.75 Set



875 PISTON RINGER

This one-piece, pocket-size tool removes and installs all makes, types and sizes of Piston Rings up to 4" and does it easily, quickly and safely. Grips ring as shown and when spreader handles are compressed, ring is expanded just enough to allow its removal from (or installation in) groove. Stretched rings and cut fingers can be avoided.

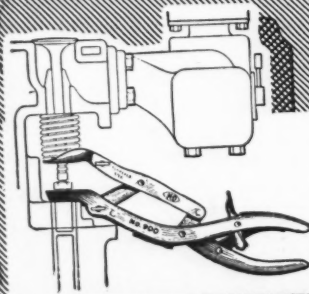
List Price . . . only \$1.35



870 PISTON RING FILER

Replaces old-fashioned, uncertain methods for sizing Rings. The double-faced rotary file cuts quickly and absolutely parallel. Adjustable, calibrated gage plate assures proper angle and eliminates human error. Saw teeth on edge of file useful for slotting pistons and many other rotary hacksaw operations. With one Cutter-file.

List Price . . . only \$4.55



900 "HI-OFFSET" LIFTER

is the fastest valve lifter for servicing the newer motors with manifolds on. Short and unusually high offset, allowing clear view and plenty of working space under fender. Total lift, with auxiliary jaws, 3". Automatic ratchet lock. Adjustable jaws tempered in oil. . . . Shown on '36 Plymouth.

List Price . . . only \$2.00

ASK YOUR JOBBER FOR DEALERS' NET PRICES

K-D MANUFACTURING CO.
Lancaster, Pa.



"No that ain't a ghost, boss, it's Oily Ed's overalls!"

Remodeling

(Continued from page 21)

In the old station, four pumps in the front of the island served the public. But in the new station six Tokheim pumps, three facing each street, make it easier to serve motorists with gasoline, further, all station salesmen are always near to the merchandise displayed in windows and on shelves in the glass inclosed island. Customers will let a salesman get an item he is describing when he has only a step or two to go, and for a customer to actually handle an item often means a sale that would otherwise not be made.

Both station owners assert that the Tokheim pumps have increased the sale of gasoline at least 35 per cent. People like these pumps where they can see exactly how much gas they are getting and just what it is costing them. Station men like them, too, especially when serving the customer who orders, "Fill her up." With these pumps the salesman can literally do that very thing, for they register in gallonage and cost each fraction of a gallon sold.

In the new station it is not necessary for patrons to drive all over the station to service their cars with air, water and gasoline. The air and water hoses are located underground in connection with the gas pumps. This gives the station man more opportunity to talk undisturbed with the customer while shining his windshield and so on, and while the second salesman is servicing the car with gasoline, oil, air and water.

Oil is placed in cars through the new fill proof oil bottles, which are proving very popular both with the public and with station men. All the latest in grease guns, pumps and spraying equipment are used in the

lubrication department of the station.

The octagon shaped main station house has six glass sides, so that merchandise displayed within is visible to motorists from all parts of the station yard. This has greatly increased the sales of many small accessories, as well as batteries, and especially of radios.

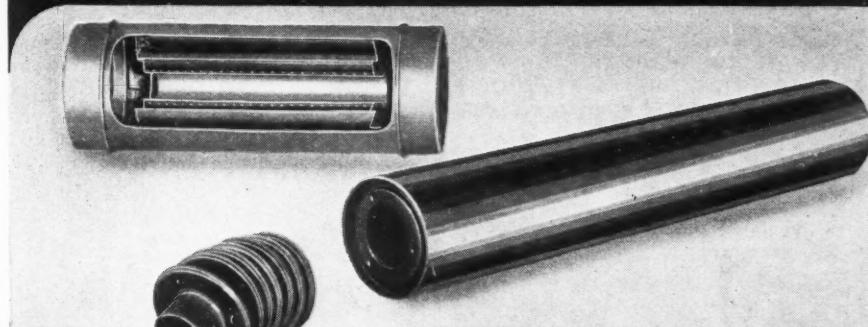
Since building the new station, there is so much more display space that Holcomb and McClintock always have a display of radios in one of their windows. Thus they have increased their radio sales 90 per cent. They find that most car owners are radio prospects when a car radio is presented to them in a manner to make them really feel its desirability. While his car is

being serviced a customer will see the display of car radios and will ask some question about them.

The question may only be, "Do you sell many car radios?" Whatever it is, it is an opening and gives the salesman an opportunity to present a radio sales talk. Sometimes he sells a radio right then, but more often his sales talk is a build-up for a later sale.

Thus, by remodeling their station, these enterprising owners were able to give better service and quicker service, as well as to show their merchandise in larger quantities and in a more attractive way. These and other features have made their place a busy service corner for out-of-town as well as local motorists.

SIMMONS MUFFLERS

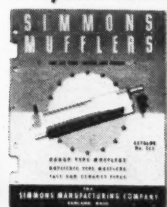


The Only COMPLETE LINE

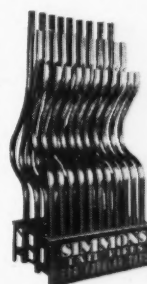
A Simmons muffler for any passenger car, bus or truck is always available in the right size and style. For the more popular cars you may select a duplicate of the original muffler, custom built for that particular car.

Where demand does not justify carrying a special muffler, select the group type muffler adapted to that car. Patented end plate adapters quickly fit the muffler to specific pipe size required.

Complete Ready-Reference Catalog



You waste no time finding out what muffler is needed for any replacement when you keep a Simmons catalog handy. All cars, trucks and busses, including 1938 models are listed. Your copy of catalog No. 311 is ready. Ask for it.



SIMMONS Tail-pipe Display Stand

Increase your profits by selling a tail pipe with a majority of all muffler replacements.

This convenient display stand helps you get that extra business. Holds 53 pipes.

The SIMMONS MANUFACTURING CO. ASHLAND, OHIO

Manufacturers of Silver King and Power King Hydraulic Jacks; Mufflers for all cars; Carburetors for all cars; replacement parts for Ford, Chevrolet and Plymouth.

SEND NEW MUFFLER CATALOG TO:

NAME

ADDRESS

CITY

N.S.P.A. Show and Convention Dates Set

With the announcement that the 1938 Automotive Service Industries Show will be held at the Navy Pier, in Chicago, December 5 to 10 inclusive, tentative dates for the Fifteenth Annual National Standard Parts Association Convention have been set for December 2 and 3 in the Hotel Sherman, Chicago.

Decision as to the place and dates for the show was reached by the Joint Operating Committee representing the three sponsoring Associations at the initial meeting of the committee

on March 23, Palmer House, Chicago. As in the past, the A. S. I. Show is being sponsored by the Motor and Equipment Manufacturers Association, the National Standard Parts Association and the Motor and Equipment Wholesalers Association.

Auto-Lite Announces New Fog and Passing Lights

The Electric Auto-Lite Co., Champ-lain and Chestnut Sts., Toledo, Ohio, has announced a new complete line of fog and passing lights, said to be approved by all States. The lights are furnished in chrome, or black and

chrome, with 7 in. lens in amber, clear, red or green. The lens is an exclusive Auto-Lite design and is claimed to be



HOW TO DIAGNOSE AND PRESCRIBE FOR A CASE OF R. P. ★

THIS WATER LOOKS LIKE A CHOCOLATE SODA, SIR! IT'S RADIATOR PHLEBITIS!

SO WHAT? AND WHAT'S RADIATOR PHLEBITIS?

RADIATOR CORE CLOGGED WITH RUST AND SCALE—SYMPTOMS OF TROUBLE AHEAD—OVERHEATING—REPAIRS!

HM! WHAT SHOULD BE DONE ABOUT IT?

WE RECOMMEND RUST CURE, SIR. NO DRAINING NO FLUSHING! JUST POUR IT IN!

AND WHAT HAPPENS?

AFTER 1000 MILES OF DRIVING THE RUST IS DISSOLVED; WATER TURNS CRYSTAL CLEAR; COOLING SYSTEM GUARANTEED RUSTPROOFED FOR ONE YEAR!

SOUNDS GOOD. GO AHEAD! POUR!

NO ACIDS! NO CAUSTICS! ITS HARMLESS TO ALUMINUM AND ALL FINISHES!

HI, DOC! SYMPTOMS GONE! NO MORE RADIATOR PHLEBITIS. GREAT STUFF. MUST SELL PLENTY?

1000 MILES LATER

YOU JUST BET WE DO SIR!



ASK YOUR JOBBER FOR RUST CURE

FOR RADIATOR PHLEBITIS ★

★ MED. — Inflammation of a vein. (Characterized by a clot which must be dissolved before it reaches the heart.) Pronounced "flea-bite-us"

RUST MASTER COMPANY ONE BEACON STREET BOSTON, MASS.

capable of directing a powerful concentrated beam of light without halo.

The passing-lite is furnished with a clear, non-glare lens which directs a strong beam of light so designed that its beam will not be absorbed by oncoming headlights.

Brackets are ball and socket type with swivel direction adjustments. All lights are furnished complete with fused dash switch, 10 ft. of 12 gage waterproof cable and 34 in. of protective wire loom.

Sealed Power Corp. Completes New Warehouse

A new warehouse, representing an addition of 61,250 square feet to the main plant, has just been completed by the Sealed Power Corporation of Muskegon, Michigan. The new structure is two stories high and is connected to the factory by an overway bridge. It will be used to store millions of Sealed Power motor parts and is expected to expedite service on piston rings, pistons, piston pins, expanders, valves and cylinder sleeves, the products manufactured by the corporation.

The warehouse is the second of three building projects begun a few months ago to be completed. A new addition to the office building comprising 4800 square feet, was finished in January. A new foundry which represents an increase of 48,327 square feet is already being constructed.

Before this building program was begun, the Sealed Power plant occupied 217,239 sq. ft. When the program is completed, the plant will occupy 331,616 sq. ft.

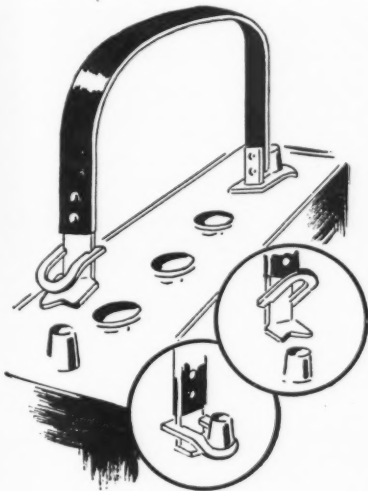
New Body Refinish

A new type of body refinish has been introduced by McGuire Anti-Freeze Co., Johnson City, Tenn. Said to be not a paint, not a wax, not a polish, not a cleaner, but a new preparation that is simply applied with a cloth and allowed to dry, this product will produce a glossy mirror finish in 30 minutes, it is claimed.

Write the manufacturer for a sample of this new Magic Auto Refinisher.

Carrier For New Type Batteries

The National Machine & Tool Co., Jackson, Mich., has announced a new battery carrier, their No. 545. This new carrier has a simply designed automatic jaw that grips the terminal posts firmly and which cannot be released while the weight of the battery rests on the carrier. The new product is made of the same strong, acid-resisting material as the other Na-



tional battery carriers, and like them is available in two sizes, No. 545 Short for conventional batteries, and No. 545 Long for the 20 in. long batteries in use on many of the 1938 cars.

Promotions at Norma-Hoffmann

Norma-Hoffmann Bearings Corporation, Stamford, Conn., announces the appointment of Mr. D. E. Batesole, formerly assistant chief engineer, as chief engineer succeeding the late Geo. R. Bott. Mr. T. E. Rounds of the Engineering Department has been made assistant chief engineer.

Bear Has New Wrecker

An entirely new type, low priced Wrecker unit which fits any truck chassis has just been placed on the market by the Bear Mfg. Co., Rock Island, Ill. Instead of the usual hoist, the new wrecker employs the new Bear scoop principle which is said to eliminate all possibility for further damage to the car during the pickup



and tow. The scoop will get under the car even though the front wheels are

broken, and it is not necessary to remove the bumpers or fenders. Another outstanding feature is the Bear method of hooking up the disabled car to the tow truck boom. A special device is used on the end of the boom so that the car is held rigidly in place.

Willys Builds Strong Organization

The appointment of Floyd F. Kishline as assistant chief engineer of Willys-Overland Motors, Inc., announced by David R. Wilson, president, brings another nationally known figure to the group of outstanding ex-

ecutives who have been added to the Willys forces since the first of the year.

Mr. Kishline, formerly chief engineer for Graham-Paige Motor Corporation, is chairman of the Detroit division of the Society of Automotive Engineers and has for many years been prominent in the motor car industry for his work in developing maximum power output from automobile engines at the most economical operating costs.

In his work with the Willys organization, Mr. Kishline will be closely associated with Delmar G. Roos, who was elected vice-president in charge of engineering for Willys.

Keep Repair Jobs Moving— AVOID COSTLY DELAYS by using

HERBRAND TOOLS

Your Herbrand Jobber has a complete line of unbeatable combinations in Time and Labor Saving Tools. The Rollway Workshop (at right) consists of 101 necessary tools, removable chest, and portable workbench. It glides smoothly from job to job, and keeps every tool within easy reach. With this unit, the toughest service jobs can be handled with convenience, efficiency, and greater profit.

COMPLETE LINE INCLUDES

- Socket Wrenches and Handles
- Pliers . . . Screw Drivers
- Punches . . . Chisels
- Pry Bars . . . Rivet Busters
- Tappet Wrenches
- Thickness Gauges
- Valve Lifters and Compressors
- Ford Service Tools
- Chevrolet Service Tools
- Hammers
- Rim and Tire Tools
- Lubrication Tools
- Brake Service Tools
- Pipe Wrenches
- Box Wrenches (14 patterns)
- Open End Wrenches
- Pullers of all kinds
- Tube Cutters
- Body and Fender Tools
- Screw Extractors
- Retreading Tools
- Cylinder Wall Ridge Reamers



MAGIC ROLLWAY WORKSHOP

This unit is a "natural" when it comes to keeping tools handy. Rigidly constructed of heavy gauge steel, it easily houses all your tools. Large lower compartment provides for coveralls, etc. Baked blue wrinkle finish—Nickel locking clasps. Bench stands 29" high, 24½" wide, 15½" deep. Chest stands 9" high, 23½" wide and 11½" deep.



**GET THIS No. 50-M
TOOL MANUAL
FREE!**

THE HERBRAND CORPORATION - Fremont, Ohio

Send No. 50-M Tool Manual Free. Also details on complete line.

Name
Firm Name
Street
City State

Seven Midget Tracks In AAA Schedule

With the beginning of June, the American Automobile Association's circuit of midget auto racing events went into full swing.

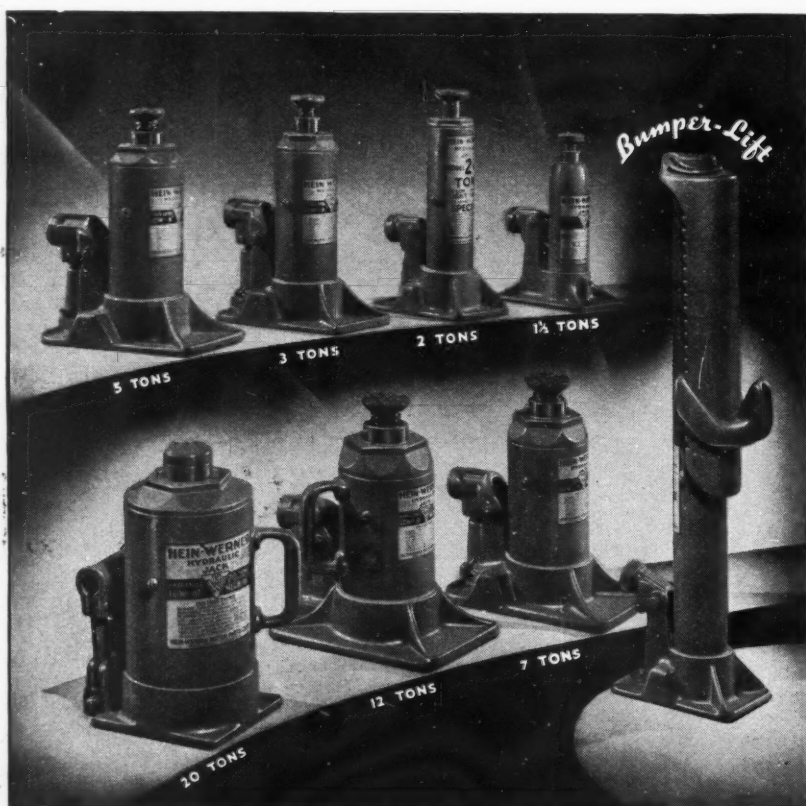
The schedule, which had its beginning in April when the AAA entered the midget field, now presents seven tracks on which eleven programs are run each week. In late June, a twelfth weekly race will be added to the schedule when the track at Long Branch, N. J., will present a Wednesday meet in addition to its weekly Saturday night program.

The eighth track on the circuit will be the board Velodrome at Coney Island, Long Island, N. Y. When it will open had not been definitely established. It was tentatively scheduled to run events there Wednesday and Sunday nights.

At AAA midget headquarters in New York City it was said 250 programs will be staged for the tiny cars before the season closes in October. The prize purses for an evening's racing range from \$500 to \$750. The estimated total purse for the season is \$200,000.

The midget tracks are running on the days listed and are paying the purses shown, as follows:

Nutley (N.J.) Velodrome, Sunday and Wednesday, \$700; Cedarhurst (L.I.) Speedway, Monday and Thursday, \$700; Newfield Park Speedway, Bridgeport, Conn., Monday, \$500; Yellow Jacket Speedway, Philadelphia, Pa., Tuesday and Friday, \$700; Castle Hill Stadium, Bronx, N. Y., Tuesday and Friday, \$600, with indicated increase later; Long Branch (N.J.) Speedway, Saturday nights until late June, then adding Wednesday nights, \$650; West Haven Speedway, New Haven, Conn., Thursday, \$600.



TESTED at 1½ TIMES RATED CAPACITY

Hein-Werner Hydraulic Jacks are compact, powerful and SAFE. Before leaving the factory, these jacks are tested at 1½ times their rated capacity. It is impossible to accidentally lower one of these jacks because the handle must be removed from the pump to open the release valve.

Complete line includes the "Buller" 1½ ton capacity jack at only \$2.80 . . . Light Truck Special, 2 ton model, \$3.70 . . . 3 ton model, \$6.95 . . . 5 ton, \$8.95 . . . 7 ton, \$11.75 . . . 12 ton, \$17.50 . . . 20 ton, \$30.00 . . . And for modern passenger cars, Light

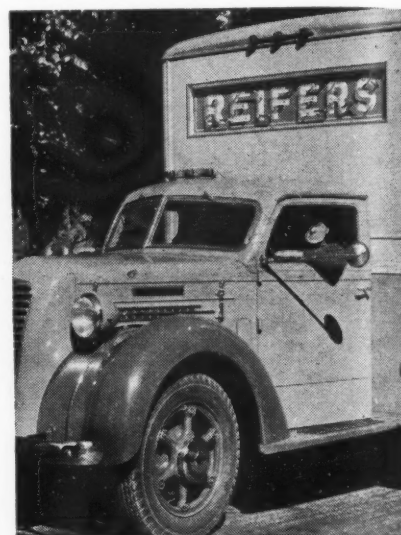
Model BUMPER-LIFT, only \$4.10 . . . Heavy Model, \$5.45 . . . All prices are net to dealer, and slightly higher on West Coast.

Hein-Werner also makes a complete line of FLOOR JACKS—2, 3, and 4 ton capacity.

All H-W Jacks are built right and priced right. . . Ask your jobber salesman or write us for details.

HEIN-WERNER MOTOR PARTS CORP.
Waukesha, Wisconsin

FEW MODELS ENGINEERED TO DO THE WORK OF MANY
HEIN-WERNER
hydraulic JACKS

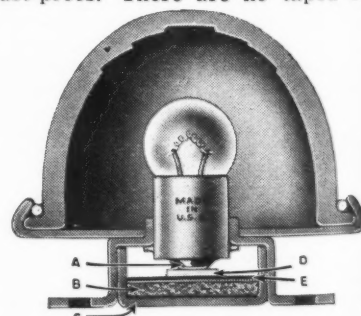


Neon on the road. It takes about eight or ten thousand volts of alternating current before a neon sign can operate. That's why the familiar storefront signs are practically unknown on the highway. However, this Diamond T truck owned by an Indiana furniture company is equipped with a sign which is lighted day and night. The sign is giving no trouble and attracts a lot of attention.

Do-Ray Has New Three-Way Light

Designed to meet present day driving conditions, the new Three-Way Lite has been announced by the Do-Ray Lamp Co., 1458 S. Michigan Ave., Chicago, Ill.

The new No. 1132 is water-proof and dust-proof. There are no taped con-



nections to loosen because the positive wiring assembly is made up of a solid brass strip.

The No. 1132 Do-Ray is supplied with lenses of any color for all 3-way light requirements. Length is 20 in. overall, and list price is \$1.50. The Do-Ray Junior Three-Way Lite is also available; length 14½ in., list price, \$1.00.

Roosevelt Race

(Continued from page 30)

ican Automobile Association's Contest Board removed the proposed event from its "tentative" schedule. Plans for the race were advanced by one of the backers of the Raceway group, it was reported in last month's **MOTOR AGE**.

Since the 250-mile-race plan was shelved, one of the nation's top-speed promoters who has so far remained in the background has worked toward revival of racing there. So far his plans have failed to materialize.

At AAA headquarters in the nation's capital it was said that "no date is reserved" for the Raceway this year. And every indication pointed toward abandonment of plans prior to the 1939 season.

The twisting race course on which two George Vanderbilt Cup races were run reverted on January 28 to the original owners, Roosevelt Field, Inc. The Motor Development Corporation, promoters of the road racing revival plant, locked the front gate with the announcement that it had lost a million dollars in the promotion.

New Lines Added

Oliver H. Van Horn Company, Inc., New Orleans, La., with branches at Houston, Texas, Shreveport and Baton Rouge, La., has added the complete line of Stanley Electric Tools to its stock of supplies and equipment for the Industrial and Automotive Trade.



HOOK ON

Repair Muffler Blow-outs in 15 Minutes

Heavy gauge, asbestos lined, 12-in. "HOOK-ON" Muffler Shoes slip completely around rusted or blown-out section. Fit 4", 5" and 6" round muffler with wide over-lap. Beaded ends and formed clamps give perfect seal. **Low cost, big profit.**

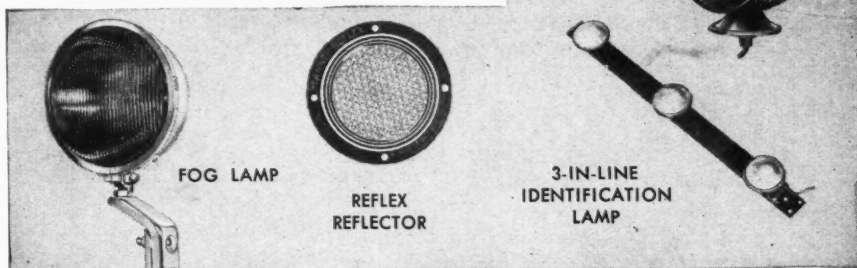
For Fords we recommend patented No. 49 (over-all) Repair Jacket, covers complete muffler (telescopes to length, laps around). Looks like new muffler. Your jobber or direct.

6 No. 50 Universal Shoes \$3.60 (net dealer cost)
6 No. 49 Ford Over-All Jackets \$5.40 (net dealer cost). Shipped postpaid if check accompanies order.

SPRING SPECIALTY CO.
7 N. 8th Ave., Maywood, Ill.

YANKEE LIGHTING* MEANS SAFETY - ECONOMY - EFFICIENCY

Yankee has been manufacturing automobile lighting devices for over 23 years, and *guarantees* its products against mechanical defects. *Yankee manufactures all items of lighting equipment required by the I. C. C. Write for illustrated catalog "E" describing other Yankee truck lighting equipment.



YANKEE METAL PRODUCTS CORP.
NORWALK, CONNECTICUT, U. S. A.

New Super-Traction

Line of Truck Tires

A new line of truck tires is announced by The B. F. Goodrich Company, Akron, Ohio. Pioneering in the development of the commercial tire for $\frac{1}{2}$ and $\frac{3}{4}$ ton equipment, Goodrich now offers the operator of light equipment a choice of the Express Type Heavy Duty Commercial for ordinary service or the new line for service where traction is a major requirement, in mud, snow or any off-the-pavement service where the going is tough.

The tire is made in a complete range of sizes.



Your Jobber Has 'Em

Fuel Lines
Brass Fittings
Dash Controls
Hydrometers

from **WEATHERHEAD**
CLEVELAND, OHIO

All Agree - Every Wheel Needs Balancing!

Sell Safety Service!

Automobile engineers all agree on the necessity of frequent wheel-balancing. As a safety measure, it is all-important. Equip your shop to render this service to car owners and see how it will increase your profits! Write today for full information about L & H Balancing Weights!

HARLEY C. LONEY CO.
16517 Wisconsin Detroit, Michigan



Fully Protected by Patents

Pat. No. 2036757

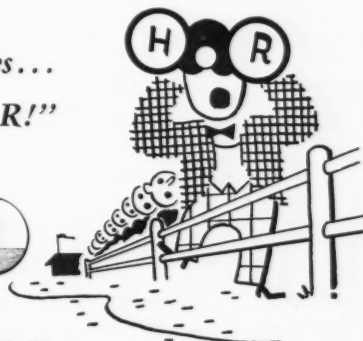
L & H
Balancing Weights

WRITE for CIRCULAR

"Here it comes...
the new H-R!"



TURN TO PAGE 72





use BOTH kinds
in these brand new
tire groovers!

**two
tools
in one**

FREE!



This \$5.00 visible
blade attachment
FREE with each
ARTISAN tool for
LIMITED TIME!
Get yours now!

Write
for new
Catalog
NOW!

Nothing like these new
grooving tools. Blades for
every tread design, from
motorcycle to bus tires.
HOT, fast—built for a
lifetime.

guaranteed 2 years
guaranteed COOL handles.

Six new ARTISAN mod-
els, new low prices start-
ing at \$14.00. Other com-
bination tools \$8.50 up.
Write for FREE TRIAL.

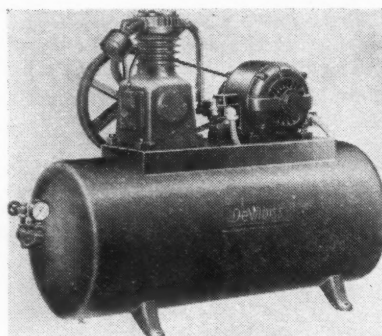
KWICK-KUT MFG. CO. Inc.
3822 Arsenal, St. Louis, Mo.

KWICK-KUT
Artisan
Grooving Tools!

DeVilbiss Has New Air Compressors

Two special low-price 1½-hp. air
compressors for garage and service
stations have been announced by The
DeVilbiss Co., Toledo, Ohio.

Both are of the horizontal type,
with electric motor and compressing
unit mounted on air tank. One, Type
UEM, is a single stage outfit, de-



signed for pressure requirements up
to 150 lb., with a maximum displace-
ment of 7.34 cu. ft. per minute. Type
UED is two stage, to meet maximum
pressure requirements of 175 lb. with
displacement of 6.85 cu. ft.

MUELLER UNIVERSAL BATTERY CLIPS



The Original and Only Complete Line
Recognized as the Best Made



Battery Charging Jumpers



Battery Carriers, Port Shims, etc.

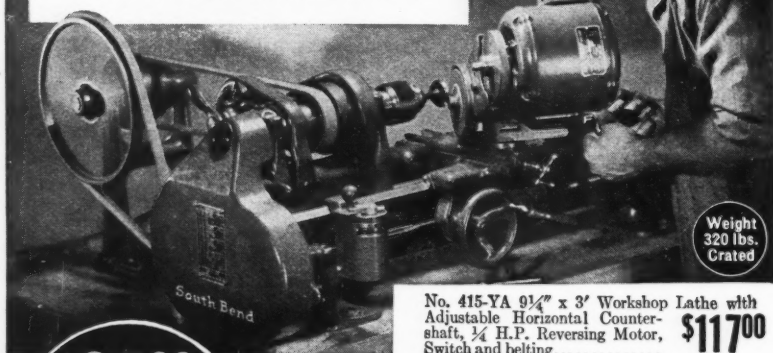
Send for Free Samples
and Complete Catalog 706!

Mueller Electric Co.

Clip Makers for 30 Years

1590 E. 31st St., Cleveland, Ohio

REFACING VALVES IN THE SOUTH BEND AUTO WORKSHOP LATHE



\$85.00

Less Motor Drive
Terms as Low as
\$6.00
a Month



No. 415-YA 9½" x 3' Workshop Lathe with
Adjustable Horizontal Counter-
shaft, ¼ H.P. Reversing Motor,
Switch and belting..... **\$117.00**

(Special Attachments Extra)

On the South Bend 9-inch Auto Work-
shop, Back-gear, Screw Cutting Lathe
you can reface valves as well as do the six
other most important jobs coming into
the modern auto service shop. This lathe
with attachments is an all-purpose auto
workshop lathe and finishes pistons—
bores rebabbitted connecting rods—cuts
screw threads—trues armatures—refaces
valves—makes bushings, and does hun-
dreds of similar automotive and general
machine operations. A most useful and
profitable tool for all modern service jobs
on automobiles, trucks and buses.

Use the coupon—Get the new auto service
bulletin No. 33-G with full-page illus-
trations showing these jobs. Write for de-
tails on our liberal easy payment plan.

68 Sizes and Types of Lathes for every purpose

9" lathe prices start at \$ 85
11" lathe prices start at \$371
13" lathe prices start at \$448
15" lathe prices start at \$544
16" lathe prices start at \$642

**South Bend
Lathe Works**
890 East Madison St.,
South Bend, Indiana, U.S.A.

Send the following booklets Free, postpaid

- ☐ How to Reface Valves
- ☐ 9" Auto Workshop Lathe Bulletin
- ☐ Easy Payment Plan.

Size of lathe interested in

Name

Address

City State

SOUTH BEND Precision LATHES

Willys Appoints Regional Sales Managers

The appointment of eight regional
sales managers and three general
sales representatives has been an-
nounced by W. C. Cowling, vice-presi-
dent of Willys Overland Motors, Inc.

Resignation of N. A. Beardsley,
General Sales Manager, was an-
nounced at the same time and a state-
ment made that no successor had been
appointed.

The regional sales managers were
given as: R. E. Wedekind, headquar-
ters New York City, northeastern
area; M. S. Suydam, headquarters
Baltimore, east central area; J. B.
Dorris, headquarters Atlanta, south-
eastern area; F. M. Finke, headquar-
ters Chicago, central area; H. B. Har-
per, special representative with head-
quarters at Denver, west central area;
S. E. Brasseale, headquarters Louis-
ville south central area; J. W. Stokes,
headquarters Toledo, north central
area; George Kavanaugh, headquar-
ters at Oklahoma City, southwest
area.

The general sales representatives
appointed were: J. R. Lake; F. T.
Luth and J. L. Heaton. All men ap-
pointed are long experienced in the
automobile industry.

The direction of dealer retail activ-
ities was put in the hands of Wm. K.
Harrison, Assistant Sales Manager.

Kuhn New Willard Export Manager

I. A. Kuhn has been appointed ex-
port manager of The Willard Storage
Battery Company, Cleveland, Ohio.

Mr. Kuhn has been with Willard
since 1913 in various capacities, pro-
moting the sale of Willard Batteries
in the United States and abroad. He
was promoted from sales manager of
the central district of the United
States to his present post.

The Seal of Satisfaction BLOK-SEAL



NEW Liquid Metal Saves Time, Money and Effort

The old long and costly welding jobs are out. Blok-Seal, the new liquid metal, perfectly and permanently repairs cracked or porous heads, blocks, valve ports and water jackets. Entire operation requires less than an hour. Blok-Seal is designated for all types of water-cooled internal combustion motors. Sold only in sealed tamper-proof cans for your protection.

Blok-Seal Laboratories
CAMDEN, N. J.

Inventors and Manufacturers

**If it's sheet metal
we'll make it.**

Large well known Midwestern Manufacturer, producers of the finest sheet metal products for half century has capacity for additional sheet metal products. Particularly interested in automotive accessories requiring stamping. Attractive arrangements. Aid in developing. Rare opportunity for inventor or small manufacturer.

Address Box 700, MOTOR AGE
Chestnut and 56th Streets, Philadelphia, Pa.

INVENTORS—Protect your rights. Before disclosing your invention to anyone send for free blank form "Evidence of Conception" and instructions. Personal attention given all cases. Lancaster, Allwine & Rommel, 415 Bowen Building, Washington, D. C.

Appearance

(Continued from page 31)

any consideration of the increase in turnover which thorough reconditioning provides for used car stocks.

Methods demonstrated create further interest because they are adaptable to any shop regardless of its size. They can be used by the small operator in a single stall in his regular service department or can be expanded to fit a complete used car reconditioning department using line production methods.

The Institute occupies headquarters at 1839 East Grand Boulevard, Detroit, and is under the direction of Dan Sunderland and F. Y. Wheeler. Sponsoring manufacturers are: Albertson & Co., Inc.; Black & Decker Mfg. Co.; Blackhawk Mfg. Co.; Bee-Bee Laboratories, Ltd.; Clayton Mfg. Co.; The DeVilbiss Co.; E. I. DuPont de Nemours & Co., Inc.; Automotive Materials Corp.; The Fairmount Tool & Forging Co.; Marquette Mfg. Co., Inc.; Watervliet Tool Co., Inc., and Walker Mfg. Co.

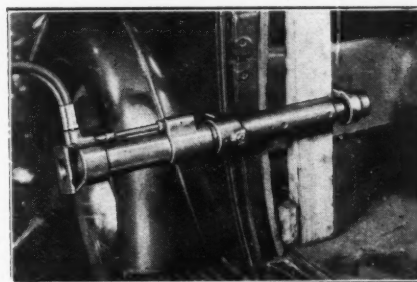
Handy Ladder For Working on Top

The Renson auto ladder, a handy 3½ ft. ladder specially designed for reaching automobile tops has been announced by The Renson Products Co., Conshohocken, Pa. A similar ladder, 6 ft. in height, is designed for buses and trucks.

Of sturdy, welded steel construction and weighing less than 7 lbs., the auto ladder meets a long-felt need when working on the car above the windows. It attaches securely to the sides of the car by specially designed vacuum cups, and does not mar the finish. The standard ladder carries a list price of \$2.95, and the bus type ladder lists at \$3.85. Contact your jobber or write the manufacturer for literature.

CLASSIFIED ADVERTISING

HERE'S A REAL SIDELINE all your customers need. New, noncompetitive, every demonstration a sale. Sells itself. Samples inexpensive, readily carried. Big easy profits. Write now. Dept. 2, 2626 Washington Blvd., Chicago.



DIRECT PULL

Full power can be exerted into a one-inch radius for the repair of box channels, rear trunk racks, door posts, etc., with the *Perfection Power-Plus Hydraulic Jack* and fittings plus **DIRECT PULL**.

Two modern Hydraulic Perfection Power-Plus units will tackle any type of body aligning, frame work, fender straightening, rear axle housing, bumper straightening, knee action adjustment, front axle straightening, steel running boards.

Perfection Power Plus, the only double-acting **PUSH-PULL** hydraulic jack, gives you Speed, Power, Dependability, Accessibility, Adaptability.

G. A. C. MANUFACTURING CO.
ASHLAND, OHIO

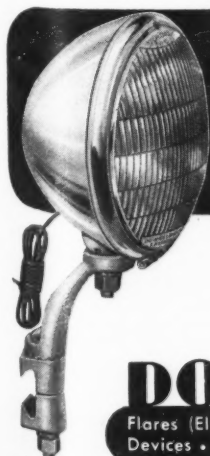
Pin Hole Honing is Cheaper and Better than Reaming

● Never a dull tool or blade-marked hole; small investment; nothing to sharpen; no guess-work or inaccurate fits. Low cost replacement Abrasives; Micrometer Adjustment. Makes ANY mechanic an expert pin fitter. Ask your Jobber today for Standard or Heavy Duty PinHone Set you need.

**3-TOOL
SET
\$26**

**HALL
PISTON PIN HONE**

Motor Temperature Gauges repaired \$1.50. Missing parts replaced. Originators of this service. Factory Methods. Radiator Shut-ter Thermostats repaired \$2.50. United Speedometer Repair Co., Inc., 436 W. 57th St., New York City.



**You Have the Winner
in this**

10000 FOGLEITE

Brass body—brass door—scientifically designed brass reflector. Over-all diameter, 7¼ inches.

Prismatic type lens throws controlled beam conforming to S. A. E. specifications.

Has prefocused 32 cp Mazda bulb and rotary fused illuminated switch. Special list \$5.00.

Ask your jobber or write

DO-RAY LAMP COMPANY
1458 S. Michigan Ave., Chicago

Flares (Electric and Oil) • Tiger-Ey and Knobby Reflex Devices • Foglites • Stop and Tail Lamps and Specialties

"Lasts 68% longer!"
Read about the new H-R
on Page 72





● Made only of the best materials . . . by the most modern methods . . . Gardiner Acid-Core Solder assures uniform high quality results on every job. Its quick acting flux permits fast, clean work. Unusually high tensile strength insures lasting bonds.

Produced by modern methods exclusive with this company, Gardiner Solder costs less than "nameless" solders that lack its consistent performance and dependable results. No wonder car manufacturers, body builders, garages and repair shops everywhere standardize on Gardiner year after year.

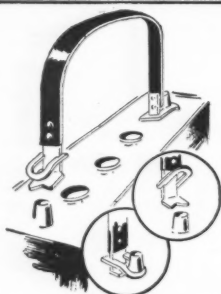
For maximum satisfaction and economy in Acid and Rosin Core Solders in various alloys and core sizes . . . body, bar and wire solders, or special solders to meet any special requirement . . . specify Gardiner-made products. They're dependable . . . ALWAYS.



PACKED IN
1, 5, AND
20-LB. SPOOLS

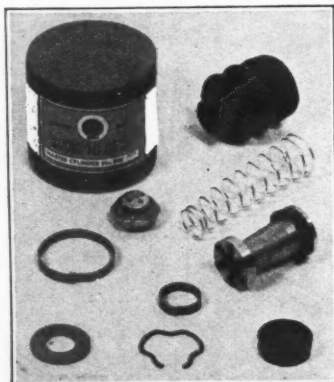


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"CAN'T
SLIP"
BATTERY
CARRIER
No. 545
35c.

Automatic jaws grab terminal posts regardless of wear. Acid-resisting. Fits all batteries including new end-to-end type. NATIONAL MACHINE & TOOL CO., Jackson, Mich.



Dependable  QUALITY

HYDRAULIC BRAKE SERVICE REPAIR KIT

For Chevrolet, Chrysler, Dodge and all other popular cars and trucks. Each kit contains all parts to completely rebuild a Wheel or Master Hydraulic Brake Cylinder.

Lion Auto Parts & Mfg. Co., Inc.
Chicago, Ill. - - - - - Dallas, Texas

K-D Valve Tools

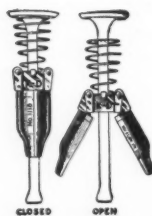
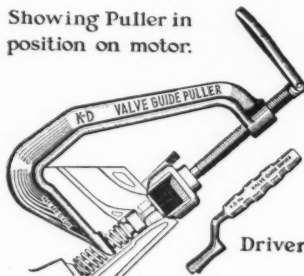
The K-D Mfg. Co., Lancaster, Pa., has just announced four new tools for servicing valves on the 60 hp. Ford. These tools are the "little brothers" of the K-D tools used on the 85 hp. Ford and on Lincoln-Zephyr.

No. 860 Valve guide puller set, consisting of a valve guide puller and a driver.

No. 260 Bar type valve lifter, to be



Showing Puller in
position on motor.



used in conjunction with the No. 860 set.

No. 865 Vacuum valve grinder, for grinding valves into their seats.

No. 1160 Valve grinding bushing, used in place of the guide when grinding valves and establishing tappet clearance.

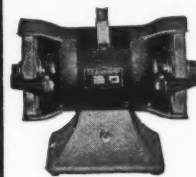
For detailed information and prices, write the manufacturer.

Deeper and Deeper

Now that the three-mile oil well has been drilled, engineers are talking about finding oil in rich sands four to six miles below the surface! Handling so many miles of drill pipe and casing, and temperatures around the boiling point, appear to be the chief difficulties, but the engineers say they can lick these problems.

An idea of what they're up against is shown by the fact that Mt. Whitney, highest American peak, is 14,495 feet high, or 1,345 feet less than three miles.

BALDOR CAPACITOR TYPE



GRINDERS

WRITE FOR BULLETIN on Complete Line. Sturdy built for long, hard grinding. Extra overload capacity. Thousands used in auto repair shops. 1/4 HP. 6"x 3/4" wheels. Wt. 39 1/2 lbs. . . . \$19.50

2-YEAR GUARANTEE Against Burn-out BALDOR ELECTRIC CO. (Electrical Mfrs. for 18 years) 4375 Duncane Ave., St. Louis, Mo.



10
Minutes

in your own shop . . . to TURN and UNDERCUT a COMMUTATOR with the new

SMART TOOL

FIRST and ONLY LOW-PRICED Unit for Servicing Armatures! Superior to a Lathe.

Ask Your Jobber.
SMART TOOLS, INC. Dept. A
FALL RIVER, MASSACHUSETTS

WELD-TITE

GENUINE

THE PIONEER MOTOR WELD

U. S. PATENT MAY 27, 1933



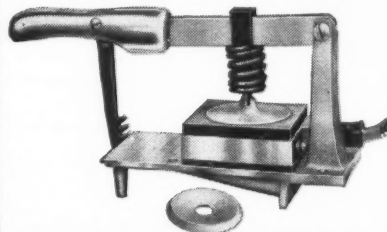
REPAIRS CRACKED CYLINDERS, VALVE SEATS & WATER JACKETS PERMANENTLY.

MADE IN LIQUID AND POWDER FORM.

ALSO MFGS. OF IRON CEMENT, RAD. SEAL, RUST REMOVER, RAD. CLEANER, CARBON AND RUST SOLVENT

ALL PRODUCTS GUARANTEED 100%
WELD-TITE MFG. CO. CAMDEN, N. J.

MODEL C TUBE PLATE



Practical for all tube repairs, and especially adapted for attaching rubber valve stems to tubes. The only one of its kind the Patent Office has allowed patents on, patent No. 2009549 and 2086866. Costs to operate less than 1/2c. per hour. Fully guaranteed. Chase Mfg. Co., 3216 Delmar Blvd., St. Louis, Mo.

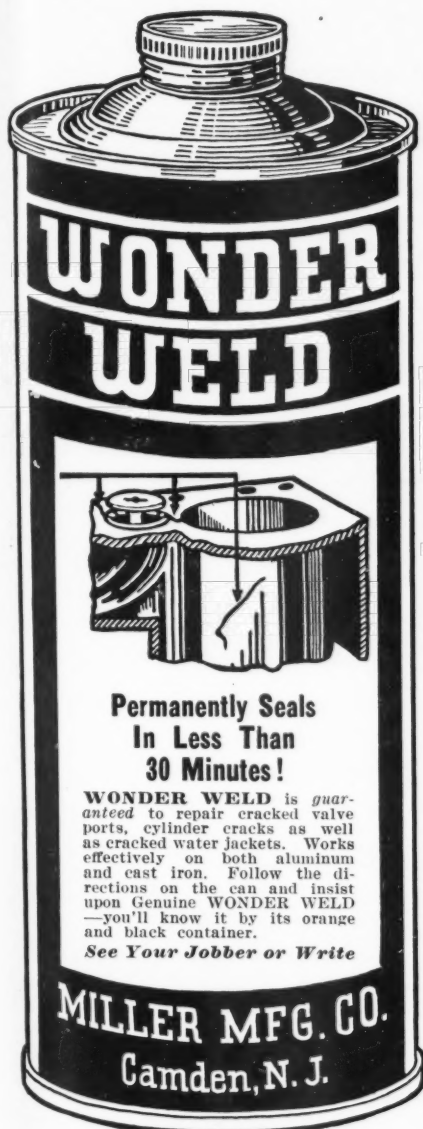


Indestructible..

Ferrule with strong, rust-proof steel wire bound to shrunken wood makes HY-TOOL "Can't Split" handle Indestructible. Drive tang in full length with certainty handle can't split and file won't work loose. Five styles for files from 2 to 20 inches.

Also, the HY-TOOL "Can't Split" Tinner's Mallet—a bear for work. Three sizes. See your jobber today or write us for details.

W. G. ASTLE (HY-TOOLS)
12 Penfield Street, Buffalo, N. Y.



USL Batteries With Glass Insulation

A new line of oversize batteries with a new type of improved fibre-glass insulation has been announced by the USL Battery Corp., Niagara Falls, N. Y. It is the same type of glass fibre mat which has proven its superiority in USL Durapak industrial batteries. Oversize plates are



used to provide extra capacity for radios and other electrical accessories. Group one of the new line has a capacity of 120 amp. hrs., with corresponding extra capacities in other sizes. Commercial car and heavy-duty truck types are also included in the new line.

Reconditions Rubber Tires and Mats

A new rubber dressing for reconditioning tires, rubber mats and running boards has been announced by The Simonize Co., 2100 Indiana Ave., Chicago, Ill. It is a paste product and is applied with a damp cloth.



After it is wiped off, the rubber has the natural black sheen it had when new. There is nothing left over the surface to check or deteriorate the rubber. Rubber Dress is packed in pound and gallon cans.

Dollars in Test Tubes

One of the country's largest chemical corporations is putting the "buy" in a petroleum by-product with plans for a \$4,000,000 project to convert Texas natural gas into synthetic alcohol, anti-freeze solutions, and other useful chemicals.

Large-scale conversion of petroleum products is growing because of the years of research accomplished by petroleum chemists. They are giving industries many new and useful materials, such as alcohols, ethers, aldehydes, acids, and resins. These are essential ingredients for a wide range of synthetic products, among them dyes, medicines, cosmetics, soaps, explosives and lacquers.



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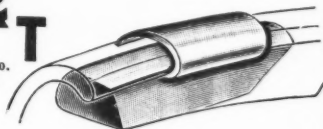
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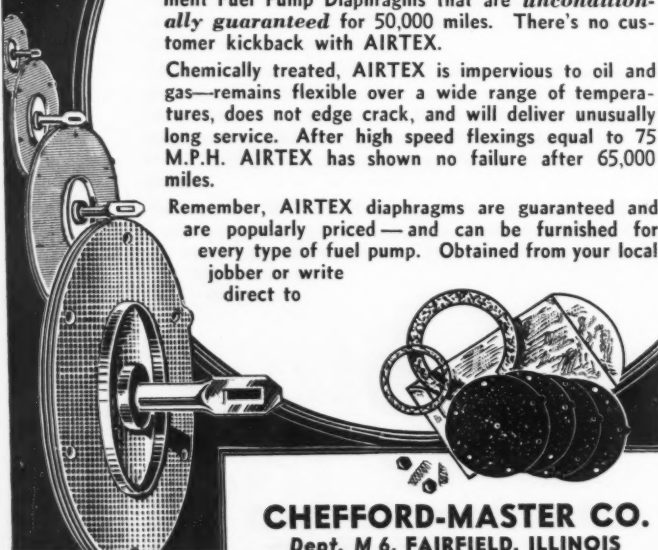
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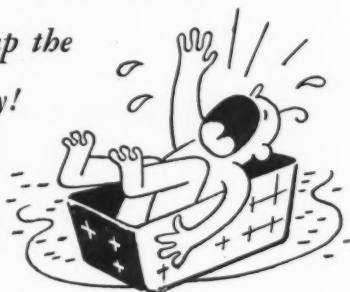


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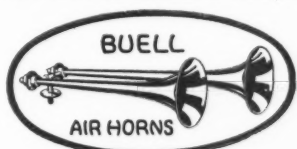


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**Frankenstein Removed as
Ford Organizer**

Internal affairs of the United Automobile Workers Union featured labor news recently with the disclosure that Homer Martin, UAW president, had removed Richard T. Frankenstein, vice-president, as director of the Ford organizing committee. Several weeks ago Martin had demoted Frankenstein to a straight vice-presidency from the office of assistant president which he formerly held.

Martin's latest action was interpreted as another step in the disciplining of Frankenstein, who incurred the president's displeasure with the proposal of a plan to eliminate factionalism within the union, although supporters of Martin have explained that the step was part of a general program which has seen all five UAW vice-presidents removed from directorships to make them available for special assignments from Martin. In support of this explanation they point to the unanimous vote of confidence extended to Martin by the international executive board recently.

**Engine Rebuilders Plan
Four-Day Session**

Arrangements are rapidly being completed for the sixteenth annual convention of the Automotive Engine Rebuilders Association which will be held in the Book-Cadillac Hotel, Detroit, June 20, 21, 22, and 23.

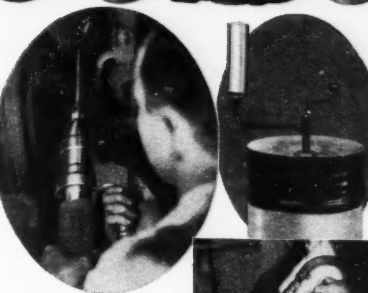
Such subjects as Merchandising of Shop Service, Safety and Resulting Business, Cylinder Finishing by the Use of Various Types of Tools and Equipment, Flat-Rate Shop Operations, Branch Operation, How to Teach Customers Ways and Means to Secure Additional Business, and Modernized Selling and Cost Comparisons are a few of the many topics to be discussed at the technical sessions.

**Applies Push-Button
Tuning to Standard Radio**

Standard automobile radio sets with manual tuning can be brought up to date with push-button tuning by the installation of a new electric tuning unit developed by F. W. Stewart Mfg. Corp., 540 West Huron St., Chicago, Ill. This new unit has six buttons—five are stations that are preselected, and the sixth is used when manual tuning is desired. Entirely automatic in its electric operation, the new unit is furnished complete with all neces-



sary wiring and brackets for mounting the motor control unit on the fire wall and the push button remote control on the under edge of the instrument panel. Optional mounting kit for mounting the push button unit on the steering column is available. List price of complete unit, \$17.50.



•Here, after years of development, is a power gun that sets an entirely new standard of economy and service. Designed by outstanding engineers, the

STANDIX POWER GUN has everything—ECONOMY IN INVESTMENT—One low-cost gun is a complete greasing system (to apply any lubricant you simply insert the proper cartridge).

ECONOMY IN OPERATION—Gun develops high pressure with low air consumption. The Refillable Cartridges and the high pressure single shot action result in saving of grease in filling and dispensing.

PERFORMANCE—Pressure to meet every condition at the touch of a trigger. Positive prime of any lubricant at low temperature (air pockets do not affect operation). Instantly convertible from high pressure single shot to low pressure continuous flow.

CONVENIENCE—Unique design permits easy, convenient application to any fitting either through rigid nozzle connection or whip hose. Exclusive adapters bring all fittings within easy reach. Cartridges are filled and refilled from stock lubricants by hand or with Standix Gun Loader pictured above.

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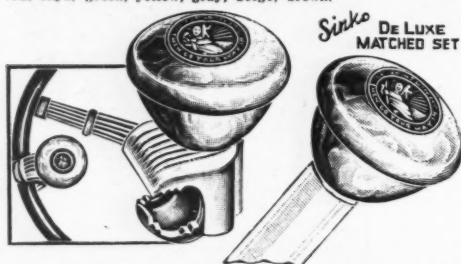
Gear lubricants in bulk or cans are handled quickly, easily—at any temperature—with the **STANDIX DISPENSER.**

The **KENT PRESSURE-PAK** makes your station headquarters for profitable wheel-pack service.

TURI-VAC AIR-LINE VACUUM CLEANER does a he-man job in double-quick time. Amazing low price and operating cost.

NEW *Sinko* DeLuxe EMBLEMIZED DE LUXE SPIN-UR-WHEEL and GEAR SHIFT BALL

Your customers will like the new Medalion inserts of the Shrine, Knights of Columbus, Masons and St. Christopher in bronze. Harmonizing streamlined design and new colors: red, onyx, green, yellow, gray, beige, brown.



The new "Rim-Mounting" DeLuxe Spin-Ur-Wheel, with its new bronze insert, makes a perfect mounting on all modern steering wheels.

The "Rim-Mounting" Spin-Ur-Wheel, fitting all types of steering wheels, clamps to the wheel, without band to deface the outer rim.

The method of attaching is simple, no dismantling is necessary. Just loosen the screw at the base, align wheels, mount and tighten securely.

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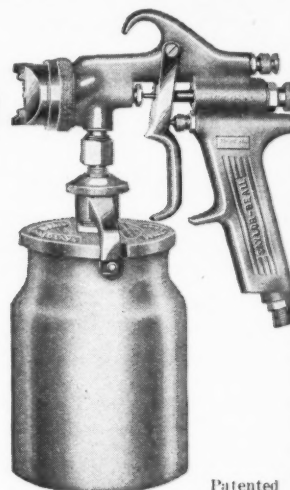
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